ience Library

SEP 9 1948

the OIL AND GAS JOURNAL

Says

"FRANKS SERVICING UNITS

Best on Market

FOR CONTRACTOR USE"

Three Days Down-Time and $363.00
For Repairs in 6 Years

Proof of this is our order today for your largest model the 137 - this will allow us to handle the deepest wells in the world

M & R SPECIALTY COMPANY
PHONE W. 9-1271
5810 LONG DRIVE
HOUSTON 12, TEXAS

August 3, 1948

Mr. R. M. White, Vice-President in Charge of Sales
Franks Manufacturing Corp
Tulsa, Oklahoma

Dear Mr. White:

I purchased one of your Model 65 Truck-Mounted Servicing Winches in 1942. The Unit has been in constant use since that time. We have used it for work-over, clean-out, and pulling rods and tubing on wells 5,000 feet to 9,000 feet deep.

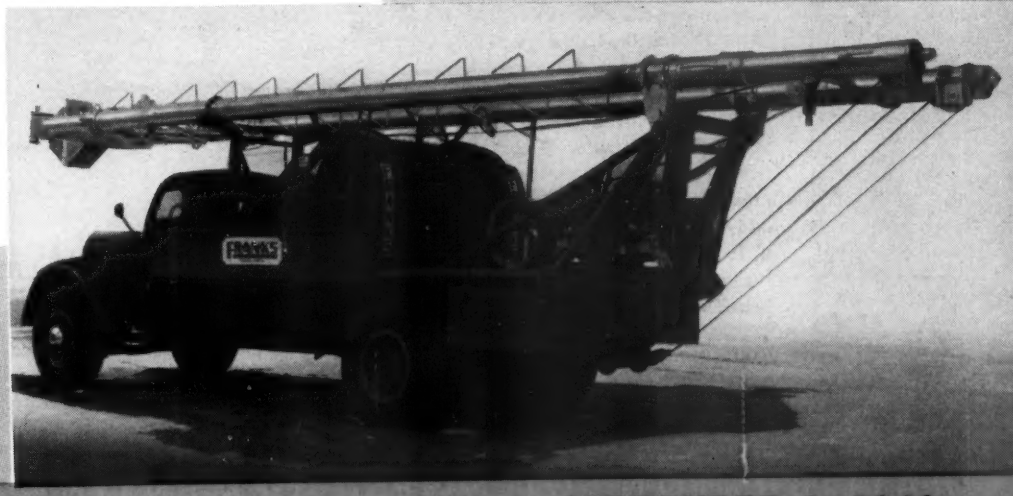
You will be interested to know our down-time for repairs has been less than three days since 1942. Our records show we have spent less than $363 00 for repairs. The unit averages over twelve hours a day and frequently it is in use [illegible] hours per day.

We are very well pleased with your units and believe Franks' are the best on the market for contractor use. The proof of this is our order today for your largest, the Model 137 Truck-Mounted Unit with a 295 horsepower engine. This will allow us to handle the deepest wells in the world.

Yours truly,
M & R SPECIALTY COMPANY
M. Manning

Below is the Franks
Model 65 Servicing Unit
Which M & R reports so satisfactory

"You can judge a man by the company he keeps," and you can judge a contractor by the equipment he buys. We are happy to number M & R among our contractor customers who are making greater profits while lowering costs to their customers with Franks units.



FRANKS MFG. CORP.
WELL SERVICING AND DRILLING UNITS
TULSA, OKLAHOMA

Office: 2801 Dawson Road
Tulsa, Oklahoma

HOWCO IS READY FOR THE UNKNOWN

What conditions will oil men meet when they push their bits deeper into the earth's crust?

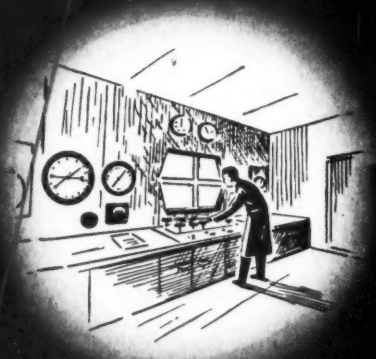
What effect will 400-degree temperatures and 20,000-lb. pressure have on drilling mud, cement, steel, rubber, tools, instruments and equipment?

We know that high pressure, coupled with high temperatures, creates changes. But the degree of change and extent of the corrective design required are unknown and must be found.

To find them, Halliburton has developed a test well in which the temperatures and pressures of a 20,000-ft. well are simulated. Here, through carefully planned tests and recorded results, Howco technicians will probe the unknown and remove its uncertainties.

If future wells attain a depth of 20,000 feet the industry will find Halliburton ready with materials, tools and techniques designed to meet the required stresses and strains. If not, such materials, tools and techniques will make possible an added factor of safety in wells of lesser depth.

Either way, the industry benefits.



20,000 ft. down

HALLIBURTON OIL WELL CEMENTING COMPANY

DUNCAN, OKLAHOMA

the OIL AND GAS JOURNAL

published weekly by the

PETROLEUM PUBLISHING COMPANY

211 S. CHEYENNE AVE., TULSA 1, OKLAHOMA

FOUNDED IN 1910 BY PATRICK C. BOYLE

Subscription rate to the petroleum industry, United States and foreign, 1 year, $3.00. Single copies, 20 cents. Back copies, when over a year old, 50 cents. Note: Payments from outside the U.S.A. may be in the form of an international money order or check on a U.S.A. bank. Entered as second-class mail matter at Tulsa, Okla., under Act of March 3, 1879.

Copyright 1948 by The Petroleum Publishing Co.

Vol. 47, No. 19 September 9, 1948

P. C. LAUINGER, *President* — C. O. WILLSON, *Editor*

S. H. ROURKE, *Business Manager* — KENNETH B. BARNES, *Engineering Editor*

H. B. PIGMAN, *Circulation Manager* — HENRY D. RALPH, *News Editor*

W. L. NELSON, *Technical Editor* — PAUL REED, *Pipe-Line Editor*

GEORGE H. WEBER, *Refining Editor*, New York 17, 415 Lexington Ave.

Associate Editors

LYNN M. NICHOLS — NEIL WILLIAMS

CHARLES J. DEEGAN — R. B. TUTTLE

C. DUDLEY JOHNSTON, *Staff Artist*

District Editors

TED A. ARMSTRONG — JOHN C. CASPER

J. W. CLOTE, Tulsa 1, 211 S. Cheyenne

D. H. STORMONT — CARL F. HOOT, Dallas 1, Mercantile Bank Bldg.

DAHL M. DUFF — L. S. McCASLIN, Jr., Houston 2, Sterling Bldg.

BERTRAM F. LINZ, Washington 5, 621 Albee Bldg. — WARREN W. BURNS, New York 17, 415 Lexington

HERNDON DAVID, Los Angeles 14, 650 S. Grand Ave. — O. C. PRESSPRICH, Saginaw, News Bldg.

VICTOR LAURISTON, Chatham, Ont., 35 Stanley Ave.

POLLY DE ARMOND

ESSIE MAE ABBOTT

Editorial Assistants

Advertising

MITCHELL TUCKER, *Manager*

WAYNE RIVES, *Vice Pres., Gulf Coast Sales*, Houston 2, Sterling Bldg. — C. R. FARMER, *Chicago Manager*, Chicago 2, 105 W. Madison

CHARLES A. WARDLEY, *Eastern Manager*, New York 17, 415 Lexington Ave. — E. S. KLAPPENBACH, *Chicago Representative*, Chicago 2, 105 W. Madison

ALFRED MILTON JONES, *Pittsburgh Representative*, Pittsburgh, 429 Fourth Ave. — DONALD O. HANSON, *Los Angeles Manager*, Los Angeles 14, 650 S. Grand Ave.

JOHN D. REILLY, *Tulsa Representative*, Tulsa 1, 211 S. Cheyenne Ave. — A. J. CHAMBERS, Beckenham, Kent, England, 33, The Avenue

J. PARKER HOLLAND, *Production Manager*, Tulsa 1, 211 S. Cheyenne Ave.

Member

Audit Bureau of Circulations

Associated Business Papers

Table of Contents

NEWS DEVELOPMENTS

Aid to Mexico Is Favored by Wolverton Committee 44
Extension of Voluntary Agreements Is Possible 44
Strikes Curtail Nation's Refining Capacity 45
Holman, Swensrud Will Address N.P.A. Meeting 45
Increasing Stocks Seen by Bureau of Mines 46
Product Supplies to Be Adequate, Committee Reports 46
Hoarding No Security Solution, Holman Says 48
Eastern Co-Ops Move to Assure Oil Supply 48
Chemists Told Trend to Continue Toward Higher-Octane Fuels 50
Oil Industry in Japan Being Returned to Private Enterprise .. 52
Italy Expected to Ask for Drilling Equipment 52
Bolivian Program Aims to Supply Oil at Lower Costs 54
New Oil Policy Urged by Compact Legal Committee 56

Editorial 43
This Week 47
Watching Washington ... 49
International News 52
Refining News 117
Pipe-Line News 121
Natural-Gas News 125
Statistics and Trends 148

ENGINEERING AND OPERATING

Katy Gas-Cycling Plant—Largest of Type in Operation 64
Review of Cementing and Perforating Practices 69
Chart for Calculating Two-Phase Formation-Volume Factor .. 75
Journal-Guide to Jameson Field, Coke County, Texas 77
Petroleum Engineering Schools—University of Kansas 78
American Chemical Society Abstracts 83
Book Reviews 93
Atlantic Refining Co.'s First Year With Unisol 95
Progress in Metals 105
Engineering Fundamentals—Theoretical Productivity Index .. 107
The Refiner's Notebook—Cost of One Brake Horsepower 109
Oil and Gas Equipment Digest 111

EXPLORATION AND DRILLING

California Sees Oil Prospects in New Areas 133
Highlights of Week's Developments 133
Reports by Areas Start on Page 134
Weekly Well-Completion Record 148
Daily Average Production for Week 149

ADDITIONAL FEATURES

Personals 59
Deaths in the Industry .. 63
Drilling Contractors 127
Market Summary 150
Equipment Men in News .. 152
Classified Advertising 154
Events on Calendar 158
Advertisers' Index 158

PERMANENT RESILIENCE

Resilient parts made from HYCAR synthetic rubber *stay* resilient. That's partly because of HYCAR's unusual chemical stability—its resistance to oil and gas, acids and most other chemicals. And parts made from HYCAR are extremely resistant to the effects of oxidation, sunlight, and normal aging. A HYCAR sealing ring, for example, will maintain a positive seal through years of service even when constantly exposed to oils and acids inside the pipe, and sunlight and salt air outside.

Other unusual and valuable properties are listed in the box at the right. But most important, these properties may be had in an almost limitless number of combinations, each designed to meet the specific service conditions of the finished part. Parts made from HYCAR have seen service in *every* industry, giving long life, dependability, and economical operation.

That's why we say ask your supplier for parts made from HYCAR. Test them in your own applications, difficult or routine. You'll learn for yourself that it's wise to use HYCAR for long-time, dependable performance. For more information, please write Dept. HG-10 B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio.

WHAT HYCAR DOES IN OIL FIELD APPLICATIONS

1. *Resists oil and gas—even under high pressures and temperatures.*
2. *Resists action of abrasive-laden fluid under high pressure and at high velocity.*
3. *Wears at slow rate even under worst conditions.*
4. *Makes a positive, leak-proof seal, even after a long period of service.*
5. *Provides high elasticity.*
6. *Gives high tensile strength.*
7. *Has minimum tendency to cold flow and compression set.*

Hycar

Reg. U. S. Pat. Off.

American Rubber

B. F. Goodrich Chemical Company

A DIVISION OF THE B. F. GOODRICH COMPANY

THE OIL AND GAS JOURNAL

A 1949 MUST

LAST week we reported two additional natural-gas pipe-line projects—both to draw on Texas and Louisiana reserves—one to supply the Chicago area, and the other consumers in five southern states. The trunk-line mileage is to total 2,200 and the cost nearly 200 million dollars. The lines are to be 20 and 26-in. with a capacity of 565 million cubic feet daily.

This could not be considered a normal week in natural-gas activities, yet reports of expansion or new systems which would have made headlines prewar are now considered routine weekly developments. Reflecting this situation, the Federal Power Commission has just announced that during the first half of the year the commission authorized the laying of 3,547 miles of new trunk lines with a capacity of nearly 900 million cubic feet daily. This follows a record growth in 1947. Important new programs have been authorized and others are pending since July 1.

The reasons back of this phenomenal growth can be summarized quickly. Producers have the required current supplies with proven reserves rapidly increasing. Millions of new consumers are waiting for connections and old customers have increased their purchases. Adequate capital is available for financing. From the standpoint of supply and demand, as one financial and operating authority points out, the natural-gas business is soundly based.

But it would be ostrich-like to assume that all the problems of natural gas have been solved. Those most familiar with conditions feel the industry is headed for trouble unless pending issues are settled promptly.

It is unnecessary to explain to Journal readers that under FPC rulings and court decisions, federal controls of natural gas have been extended to the point where the interests of producers, transporters, and consumers are jeopardized. Two members want more authority and, backed in part by court findings, would extend federal controls from well head to burner tip.

The industry's views, which had strong support in the Eighteth Congress and which were completely analyzed in the recently completed natural-gas investigation, in brief, insist on continued competition in production and use, to which the natural-gas business owes its growth and which is basic in the application of state conservation programs.

The natural-gas committee of the Minerals Section at the meeting of the American Bar Association in Seattle this week makes a comprehensive analysis of the varying views and agrees that "after the forthcoming elections have removed the incentive to make a political football of the proposals (industry's), Congress can be convinced that the public welfare requires the enactment of the main proposals as amendments to the Natural Gas Act."

A united gas industry can accomplish this objective early in 1949.

Substantial Aid to Mexico Is Favored by Wolverton Committee

by Bertram F. Linz

WASHINGTON.—Members of the House interstate commerce committee who made a survey of the Mexican oil industry returned to Washington last week convinced that the Mexican Government and Petroleos Mexicanos should be given assistance in the shape of additional capital, techniques, and personnel to develop Mexico's oil resources.

During a 2-week stay in Mexico, the committee visited the principal fields and surveyed refining and distribution installations. Upon his return Chairman Charles A. Wolverton of New Jersey said the committee was favorably impressed with the high caliber, technical training, and integrity of the management and supervisory personnel with whom they came in contact.

"We appreciate the limitations under which Petroleos Mexicanos is laboring in the full development of Mexico's petroleum resources in its need for additional materials and equipment in all fields of activity," Wolverton said.

"As we traveled over the country we met businessmen, financiers, industrialists, government officials, and other citizens. As a result of these contacts we have been impressed with the forward looking spirit of the people of Mexico.

"The committe also has been impressed with the social spirit shown by organizations such as Petroleos Mexicanos which, while intent on producing, refining, and marketing operations, at the same time seeks to promote the welfare of the people. The schools, the hospitals, the homes, and other facilities for raising the standards of living of many people, made possible through the operations of this company, have impressed all who have seen them.

"This visit, we feel, not only will contribute to a better understanding of our mutual problems and aspirations, but I am hopeful will result in more satsifactory procedure for developing Mexico's oil resources in accordance with Mexican law."

Wolverton said the committee has not completed its studies of the Mexican situation, and it is expected again to go into the question of steel exports for Mexican development before preparing a full report for submission to Congress next January.

Committee members making the trip included Representatives Carl Hinshaw of California, Wilson D. Gillette of Pennsylvania, Robert Hale of Maine, Marion T. Bennett of Missouri, James I. Dolliver of Iowa, John W. Heselton of Massachusetts, Henderson H. Carson of Ohio, Robert Crosser of Ohio, Lindley Beckworth of Texas, Oren Harrison of Arkansas, Richard F. Harless of Arizona, Eugene J. Keogh of New York, and Frank L. Sundstrom of New Jersey.

Mexican factories, Wolverton said, "are already turning out products as rapidly as possible," but, he continued, additional capital equipment "is sorely needed to maintain and further the increased standard of living already being achieved."

COMPACT GOVERNORS CONFER IN NEW YORK

Four governors of Compact states are shown here as they conferred during the meeting of the Interstate Oil Compact Commission in New York August 30-September 1. Left to right are Governors Beauford H. Jester, Texas; James H. Duff, Pennsylvania; Roy J. Turner, Oklahoma; and Millard F. Caldwell, Florida

Extension of Voluntary Agreements Is Possible

WASHINGTON.—The voluntary agreements under which the oil industry will cope with any product shortages that may develop this winter and the steel industry will channel steel to petroleum operators for field operations, barge and tanker construction, and other purposes, can be made valid for a period of 6 months beyond the time limit of Public Law 395, which expires next February 28.

A ruling by Attorney General Tom C. Clark has clarified a contradiction in the law itself, which, in one section, states that the President shall not approve an agreement unless it "specifically provides that it shall cease to be effective on or before March 1, 1949," and in another stipulates that "the power to make requests conferred by this act shall expire upon expiration of Section 2 of this act, and any requests made and voluntary plans adopted under this act shall have no force or effect 6 months thereafter."

Extension Favored

Clark said that while the problem of reconciling the two sections "is a troublesome one," he felt that "it would be entirely proper for the Department of Commerce, with the approval of this (Justice) department' to request the parties to the contract to take a unilateral action during a further period following March 1, 1949, in line with the provisions of the agreement."

The date of expiration of agreements is of particular importance with respect to those channeling steel to the oil industry, since the production programs of the steel mills have to be planned considerably in advance. With an expiration date of February 28, 1949, no allocation program could be planned after this month with any assurance it could be carried out.

The petroleum agreement approved last month also carries a provision terminating it "at the close of business on February 28, 1949, or at such earlier time as the Secretary of the Interior may hereafter designate," but a simple acceptance by participants or an amendment formally announced by the Secretary of the Interior would permit its continuance for the 6 months grace period conferred by the law, according to officials.

Nation's Refining Capacity Sharply Curtailed by Major Strikes

MAJOR refineries with an aggregate crude-processing capacity in excess of 700,000 bbl. daily were shut down by strikes this week.

In California an estimated 16,000 members of the Oil Workers International Union (CIO) walked off their jobs at 12:01 a.m. September 4, shutting down operations at refineries of all but one major company. That company, General Petroleum Corp., has a union contract extending to February 1949.

Many independent California operators were unaffected by the strike, but their output of products was only a small part of the normal daily production.

Hopes for an early settlement came early this week when union representatives said they had accepted the invitation of the California Conciliation Service to reopen the question of wages.

Ohio Refineries Closed

In Ohio, the Toledo and Cleveland refineries of Standard Oil Co. (Ohio) remained closed as the strike there wound up its ninth week. Representatives of the union, which called the workers out July 8, were scheduled to meet this week with company officials in a renewed effort to reach an agreement on the opening of the Cleveland refinery, but there was no development in negotiations regarding the Toledo refinery, which has a crude capacity of 20,000 bbl. daily. The Cleveland refinery has a capacity of 42,000 bbl. daily.

Wages provided the issue in the California strike. The union demanded a flat 30-cent hourly increase, later scaling the figure down to 21 cents. The oil companies offered a 10-cent increase, and later raised the figure to 12½ cents.

In the Ohio strike, wages were in the background of negotiations. The union had demanded action on 25 issues in addition to wages but balked, a company spokesman said, when the company declared it would make "no further concession" on nine of the issues. The spokesman said if the union would agree on these nine points, "we will see what can be done on the other 16." He indicated that a wage increase would be acceptable to the company.

Shortages Expected

A California oil-industry statement said the strike there would result in a gasoline shortage "within a few days" in California, Washington, Oregon, Nevada, and Arizona. The five states depend on California refineries for more than 90 per cent of their petroleum products.

As refinery storage was frozen by the strike, industry representatives agreed that only products already in distribution channels would be available to the public. Reese H. Taylor, president of Union Oil Co. of California, declared he was hopeful that Interior Secretary J. A. Krug would impose a program to allocate supplies evenly from all producers.

The possibility also was being considered that the federal Government might move to take over the struck plants under its seizure powers provided in the Selective Service Act. This act empowers the President to seize industries which fail to meet defense procurement contracts. Contracts to supply the armed services with petroleum products have been let to Union, Richfield Oil Co., Standard Oil Co. of California, General Petroleum Corp., The Texas Co., Shell Oil Co., Inc., and others.

Major refineries shut down by the California strike and their daily crude-processing capacity include:

Standard Oil Co. of California—Richmond, 125,000 bbl., and El Segundo, 100,000; Shell Oil Co., Inc.—Martinez, 45,000, and Wilmington, 52,000; Union Oil Co. of California—Oleum, 64,500, and Wilmington, 59,000; Tide Water Associated Oil Co.—Avon, 60,900; Richfield Oil Co.—Wilmington, 80,000; and The Texas Co.—Los Angeles, 50,000.

Just about a year ago the threat of a similar strike was made by the union, but last-minute negotiations were successful in preventing a walkout.

Not Nation-Wide

In Fort Worth, O. A. Knight, president of the O.W.I.U., said the California strike had "no nation-wide aspects" and that it represented a move to complete the third-round pattern of wage increases which, he said, had not been completed in California.

J. Elroy Brown, union district director, said Texas and eastern United States oil workers have received increases bringing their scale to $1.95 an hour on the average. The 12½-cent company offer in California, he said, would mean only a $1.80½-cent scale. Company representatives said the offer, had it been accepted, would have brought the total of postwar wage increases to $5.22 daily.

Holman, Swensrud Will Address N.P.A. Meeting

TALKS by Eugene Holman, president of Standard Oil Co. (N.J.), and Sidney Swensrud, president of Gulf Oil Corp., will highlight the general sessions of the annual meeting of the National Petroleum Association.

The meeting will be held September 15-17 in the Hotel Traymore, Atlantic City, N. J.

General sessions will be held Wednesday and Thursday afternoons, with group meetings scheduled for the mornings of the 2 days.

Following are papers which will be presented at the meeting:

WEDNESDAY, SEPTEMBER 15

General Session

2 p.m.—"The Truth About the Taft-Hartley Law," Rep. Fred A. Hartley, Jr.; "Congressional Interest in the Oil Industry," Sidney A. Swensrud, president, Gulf Oil Corp.

THURSDAY, SEPTEMBER 16

Group Meetings (10 a.m.)

Department of Standards and Tests and Department of Manufacture (Joint Meeting).—"Fuels and Lubricants for the Modern Engine," R. J. S. Pigott, chief engineer, Gulf Research & Development Co.; "Utilization of Refinery Gases by the Polyform Process," W. C. Offutt, M. C. Fogle, and H. Beuther, presented by Clark Fogle, Mellon Institute of Industrial Research; "Insulation of Oil Refineries," Utley W. Smith, manager, Magnesia Insulation Manufacturers Association.

Department of Traffic and Transportation.—"What's Ahead for the Railroads," Roland Rice, assistant general counsel, Association of American Railroads; "Recent Decisions Affecting Regulation of Private Carriers and Other Subjects," Harry S. Elkins, traffic attorney, National Petroleum Association.

Department of Industrial Relations.—"Reexamining the Wage and Salary Program," Carl H. Swenson, supervisor of wages and salaries, Standard Oil Co. (N.J.)

General Session

2 p.m.—"Economic Cooperation Administration," Bryan Houston, director, Office of Information, ECA; "A New Look in Oil," Eugene S. Holman, president, Standard Oil Co. (N.J.); "Lubrication, Fact or Friction," M. B. Chittick, chairman, American Petroleum Institute Lubrication Committee.

Stanolind Adds Acreage, Delays Laboratory Start

An additional 20-acre tract has been purchased in Tulsa by Stanolind Oil & Gas Co. as part of the site of its proposed new research laboratory. The company already had purchased 60 acres for the facility.

A. L. Solliday, executive vice president, said construction will not be started "for at least a year."

Construction originally was to have been started this year. Reasons for the delay, Solliday said, are high and unstable construction costs at present and the fact that essential materials are difficult to obtain.

Increasing Stocks Seen By Bureau of Mines

WASHINGTON.—The Bureau of Mines last week added up the supply and demand situation and joined in the spreading conclusion that the oil shortage is over.

In a revised forecast, it estimated that the industry would wind up the year with 37,000,000 bbl. more crude and products in inventory than it had at the beginning of 1948, even after allowing for a 7 per cent increase in total demand over 1947. Last year ended with stocks 5,000,000 below the January 1 figure.

With increased imports and reduced exports of crude anticipated for the remainder of the year, the bureau cut the estimated fourth-quarter demand for domestic crude by about one-half per cent from its previous forecast, to 5,562,000 bbl. daily.

For the fourth quarter, the bureau etsimated total production at 6,022,000 bbl. daily; imports 576,000; total demand 6,728,000, including exports of 375,000 and domestic demand of 6,353,000; and runs to stills 5,700,000.

Production Up

The bureau's latest forecast places total production for this year at 2,160,000,000 bbl. against 1,988,800,000 last year, including 2,014,000,000 bbl. of crude against 1,856,100,000 and 146,000,000 bbl. of other oils against 132,700,000. Imports are figured at 187,000,000 bbl. against 159,600,000, making a total new supply of 2,347,000,000 bbl. against 2,148,400,000.

Domestic demand is placed at 2,168,000,000 bbl. against 1,989,000,000, making a total demand of 2,310,000,000 bbl. against 2,153,400,000.

The latest estimate of domestic demand, by products, is as follows: Motor fuel, 876,000,000 bbl. against 794,800,000 in 1947; residual, 525,000,000 bbl. against 518,400,000; distillate 355,000,000 against 298,200,000; kerosine, 117,500,000 against 102,500,000; all other, 294,500,000 against 275,100,000.

More Refined Stocks

"Increased oil supplies in 1948," the bureau concluded, "should provide for a substantial increase in refined stocks and for a 7 per cent increase in total demand compared with 1947, including a decline in exports of about 14 per cent and a gain of almost 9 per cent in domestic demand in continental United States." "This increase," it said, "in domestic demand includes estimates of a 10 per cent gain in the demand for motor fuel compared with 1947, a 19 per cent increase in the demand for light fuel oils, and a 14 per cent increase in the demand for kerosine."

Product Supplies to Be Adequate, Economics Committee Reports

ADEQUATE supplies of all products will be available to meet the record consumer demands expected this winter—if the winter is "normal," the economics advisory committee of the Interstate Oil Compact Commission predicted last week.

In two tables presented below, the committee placed the statistics from 1947 and, viewing current trends, projected its views through the first quarter of 1949.

In its accompanying remarks, the committee said additions to stocks will be about 310,000 bbl. daily during the second and third quarters of this year, "thereby rebuilding stocks to adequate working levels."

It is estimated that "withdrawals from stocks of about 180,000 bbl. daily can be made next winter while maintaining inventories that should be sufficient for normal operations."

Details of the Compact meeting may be found on page 56 and in the September 2 issue of the Journal, page 37.

TABLE 1—TOTAL PETROLEUM DEMANDS
(Thousands of barrels daily)

	Winter 1947-8	Winter 1948-9	Change Quantity	Change Per cent
Gasoline	2,232	2,412	+ 180	8
Kerosine	403	443	+ *40	*10
Distillate fuel oils	1,194	1,350	+*156	*13
Residual fuel oils	1,563	1,583	+ 20	1
Other products	902	955	+ 53	6
Total	6,294	6,743	+ 449	7
Domestic demand	5,935	6,390	+ 455	8
Export demand	359	353	— 6	—2

*The winter of 1948-9 is assumed to be normal, compared with a winter colder than normal in 1947-8.

TABLE 2—UNITED STATES PETROLEUM SITUATION
(Thousands of barrels daily)

	Actual			Projection			
	Year			1948			1949
Demand:	1947	1st Q.	2nd Q.	3rd Q.	4th Q.	Year	1st Q.
Gasoline	2,308	2,117	2,616	2,735	2,525	2,498	2,300
Kerosine	301	444	234	230	410	329	475
Distillate fuel oils	899	1,313	834	760	1,220	1,032	1,480
Residual fuel oils	1,450	1,584	1,374	1,355	1,565	1,470	1,600
Others	942	859	961	1,100	980	975	930
Total demand	5,900	6,317	6,019	6,180	6,700	6,304	6,785
Domestic demand	5,449	6,008	5,610	5,720	6,340	5,920	6,440
Exports	451	309	409	460	360	384	345
Required supply:*							
Natural gas liquid	363	393	388	400	410	398	420
Assumed imports	438	474	477	495	525	493	570
Required U. S. crude oil	5,085	5,347	5,511	5,555	5,600	5,503	5,600
Total required supply	5,886	6,214	6,376	6,450	6,535	6,394	6,590
Stock changes:							
Four major products	—22	—128	+303	+328	—198	+77	—270
Cal. heavy crude	..	+ 12	+ 12	— 2	— 2	+ 5	..
Refinable crude oil	+ 1	+ 27	— 43	— 20	+ 40	+ 1	+ 70
Others	+ 7	— 14	+ 85	— 36	— 5	+ 7	+ 5
All oils	—14	—103	+357	+270	—165	+90	—195
Closing stocks (million barrels):							
Four major products	208.2	196.6	224.2	254.5	236.3	236.3	212.0
Cal. heavy	5.7	6.8	7.9	7.7	7.5	7.5	7.5
Refinable crude oil	224.9	227.4	223.5	221.7	225.4	225.4	231.8
Others	62.0	60.7	68.3	65.0	64.5	64.5	65.0
All oils	500.8	491.5	523.9	548.9	533.7	533.7	516.3
Crude runs to stills	5,075	5,372	5,614	5,640	5,690	5,579	5,690

*Required supply (to meet demand and stock changes; not a forecast of availability) is provided by domestic production and imports. This report shows anticipated production of natural gas liquids and imports and shows the balance required as domestic crude oil production.

this week

INTERNATIONAL—Wolverton committee returns to United States after 2-week study of Mexican oil operations. . . . Chairman Charles A. Wolverton expresses hope trip will result in "more satisfactory procedure" for developing Mexican resources "in accordance with Mexican law." . . . ¶First steps taken to return Japanese oil industry to private enterprise. . . . Action described as significant move to "democratize the Japanese economy." . . . ¶Italy expected this month to request funds with which to purchase drilling equipment. . . . ¶Trinidad announces plans for $5,000,000 exploratory-drilling program. . . .

INDUSTRY—Strikes shut down major refineries with aggregate crude-processing capacity of 700,000 bbl. daily. . . . Immediate gasoline shortage expected in five-state West Coast area as workers walk out of plants of all but one major California operating company. . . . Toledo and Cleveland refineries of Standard Oil Co. (Ohio) remain closed. . . . ¶Three eastern cooperatives join Petrol Terminals, Inc., in forming $10,000,000 company to guarantee "future source of supply." . . . ¶Eugene Holman, president of Standard Oil Co. (N. J.) warns that hoarded underground reserves do not mean adequate supplies for defense. . . . ¶Stanolind Oil & Gas Co. asks authority to develop field off Texas coast. . . .

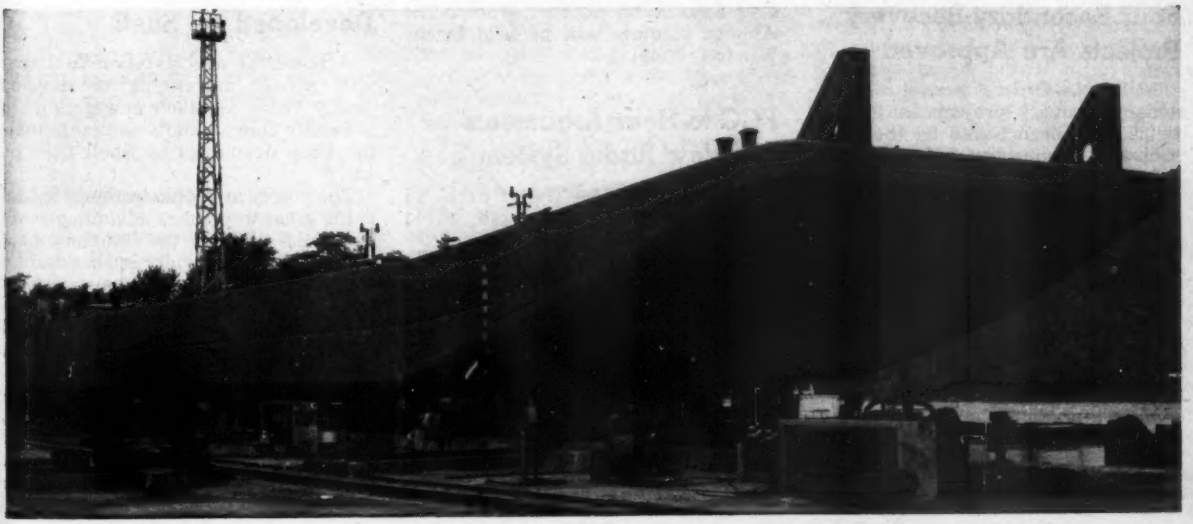
REFINING—Shell Oil Co., Inc., announces development of new aviation fuel which can double the power of aviation engines. . . . ¶Northwestern Refining Co. buys Allied Oil Corp. refinery at St. Elmo, Ill., closed since 1945. . . . Plant expected to be in operation within 60 days. . . .¶Globe Oil & Refining Co. announces awarding of contract for installation of fluid catalytic cracking unit at the company's Lemont, Ill., refinery. . . .

PIPE LINES—Change of design in trans-Arabian pipe line scheduled to increase capacity from 300,000 to 500,000 bbl. daily upon completion in 1951. . . . ¶Eastern Construction Co. begins work on 70-mile, 20-in. natural-gas line for Lone Star Gas Co. . . . ¶Texas Pipe Line Co. awards contract for taking up and reconditioning of 140 miles of line. . . . Line is being replaced by new 20-in. line. . . .

TRENDS—Crude-oil production sets nineteenth all-time record this year. . . . For week ended September 4 the new all-time high shows average of 5,525,000 bbl. daily. . . . ¶During same week Illinois, Louisiana, and California set new production records for the year. . . . ¶Total well completions for week ended September 4 was 815, unchanged from previous week. . . . Total completions included more oil wells, more dry holes, and fewer gas wells. . . . ¶Runs to stills of 5,682,000 bbl. daily for week ended August 28 shows a gain of 91,000 bbl. daily over previous week. . . . ¶Weekly increase in stocks of four major products showed largest gain this year. . . . Increase was 5,427,000 bbl. over previous week. . . . Total stocks for week ended August 28 were at 255,959,000 bbl. or 38,565,000 bbl. above the same period last year. . . . An increase of 18 per cent. . . .

GOVERNMENT—Bureau of Mines revised forecast estimates industry will end year with crude and products inventory 37,000,000 bbl. greater than that at beginning of 1948. . . . Figure is based on expected increase in demand of 7 per cent. . . . ¶New national oil policy based on conservation through state action is urged by Interstate Oil Compact Commission legal committee. . . . Compact asked to draft such a policy. . . . ¶Extension of voluntary agreements to cope with product shortages is possible, Atty. Gen. Tom Clark rules. . . .

Shown here just before launching is the first unit for a river tow which, when completed, will have a capacity of 140,000 bbl. The completed fleet will consist of six "leading units," six "after units" and three square-end sections identified as "middle units." Being built for Ashland Oil & Refining Co. by Dravo Corp., the tow was designed especially for moving cargoes of crude oil up the Mississippi and Ohio rivers to the company's refinery at Catlettsburg, Ky.



Hoarding No Security Solution, Holman Says

AN adequate supply of oil for national defense is not necessarily available just because sufficient reserves are being hoarded underground, Eugene Holman, president of Standard Oil Co. (N.J.), warns in a current magazine article.

"Some people argue that our underground oil reserves should be hoarded as a security measure," Holman declares in an article in the current American Magazine. "Actually, opening up a new field takes years. Had the great East Texas field been held as a static reserve at the time of Pearl Harbor instead of being in active production, the winning of the war would have been considerably delayed."

Citing the excellent record of the petroleum industry in supplying the record demand for heating oils last winter, Holman said: "This year we should do even better.

"Barring some sudden emergency—such as war, disaster, or a crippling strike—and in the absence of the need to ship abnormal amounts of petroleum to Europe, there is no danger that your home will go cold for lack of oil next winter."

However, he continued, Western Europe "must have oil to power its recovery program." And, he added, unless production in the Middle East can be stepped up, "that oil will have to come from sources now supplying American consumers."

"That might," he said, "mean rationing gasoline and fuel oil. To forestall this unpleasant necessity my company has acted to increase the output of Middle East oil by extending credits totaling $114,000,000 to the American company now engaged in developing the Saudi Arabian field. We have also offered to acquire a stock interest in the company."

Four Secondary-Recovery Projects Are Approved

AUSTIN.—Orders permitting secondary-recovery projects in four oil fields have been issued by the Texas Railroad Commission.

Standard Oil Co. of Texas has been given authority to conduct an experimental water flood operation to the Bennett sand underlying their Durgin lease, South Ward field, Ward County.

In Archer County, Phillips Petroleum Co. is permitted to repressure with gas the Cisco sand reservoir underlying its Lit lease in Hull-Silk-Sikes field.

L. M. Lockhart is authorized to conduct a pressure maintenance operation by injection of gas into Wright sand reservoir, Agua Dulce field, Nueces County.

General Crude Oil Co. has permission to conduct pressure maintenance operations in Middle Yegua formation in a particular fault segment, Esperson Dome field, Liberty County.

The commission also posted notice of a hearing on the application of the Taylor Refining Co. and Rupert Cox to install a pressure-maintenance plant in Pridham Lake and West Pridham Lake fields, Victoria County.

Stanolind Asks Offshore Development Authority

GALVESTON.—Stanolind Oil & Gas Co. has requested a blanket Department of the Army permit to authorize all structures and work incidental to the development of an oil field on eight tracts in the Gulf of Mexico.

Stanolind is the fourth largest acreage holder in the Texas offshore area with 56,000 acres under lease. The concern paid a bonus of $2,843,377.60 for this acreage. The requested permit covers all leases held by Stanolind with the exception of two small tracts.

Lying offshore from Chambers and Galveston counties, the leases covered in the request included: state tracts 27, 104 (S½), 105 (SW¼), 107 (S½), 141, 143 (NW¼), 144, 155 (N½), 179 (SW¼), 180 (SE¼), 187 (SW¼), 191 NW¼), 192 (NW¼), 211 (NW¼), 212 (E½), 214 (NW¼), 244 (S½ and NW¼), 245 (S½ and NE¼), 251 (NE¼), and 252 (NW¼).

Railroad Commission Changes Hearing Date

AUSTIN. — The Railroad Commission set a new date for the next state-wide oil proration hearing which will be held at Abilene October 13 instead of October 15 at Austin.

A change was necessary because of a conflict with the October 14-15 meeting of the Mid-Continent Oil and Gas Association at Fort Worth. The Abilene meeting will be held in the Windsor Hotel.

FCC to Hear Arguments For New Radio System

WASHINGTON. — The Federal Communications Commission will hear oral arguments beginning October 6 on proposed new rules for industrial radio service.

Included in the services to be considered is a proposed new petroleum service which would provide radio facilities for persons engaged in prospecting, production, refining, or pipeline transportation of crude or products, including natural gas.

Communications along pipe lines are now provided for in the Utility Radio Service, and certain other limited oil-industry communications are covered in other parts of the rules, but coordinated industry-wide communications are not now available.

Persons desiring to testify during the hearings should file a notice of such intention not later than September 15.

Eastern Co-Ops Move To Assure Oil Supply

IN a move designed to assure a sufficient supply of oil products, three eastern cooperatives last week joined Petrol Terminals, Inc., to form a $10,000,000 company known as Petrol Refining Co.

According to the agreement, Grahge League Federation, Ithaca, N. Y.; Pennsylvania Farm Bureau, Harrisburg; Southern States Co-Op, Richmond, Va.; and Petrol Terminals, Inc., will hold an equal interest in the new company.

The new company will acquire Petrol Terminals' crude supply and refining and transportation facilities.

Eugene Callis, Petrol Terminals president, placed the crude-oil supply at 30,000 bbl. daily, mostly Venezuelan royalty oil, and said the other facilities would include refineries at Texas City and Beaumont with a combined capacity of 30,000 bbl. daily and three tankers.

Callis said the three cooperatives joined Petrol because they were "unable to get sufficient supplies of oil from their regular sources and want to have an assured future source of supply."

Callis will be president of the new company and will continue as president of Petrol Terminals, Inc. The latter company will retain its Gulf and East Coast marketing facilities, he said.

New Aviation Fuel Developed by Shell

A powerful new aviation fuel that will permit an engine to develop nearly twice as much power as with presently commercially available fuels has been developed by Shell Oil Co., Inc.

The power available in the new fuel is too great to be used advantageously in ordinary planes, the company said, adding that only under such grueling conditions as combat or racing are its potentialities realized.

Designated SMT-1 (Shell Methyl Triptane-1), the fuel is made by the chemical rearrangement of petroleum molecules. Only a few thousand gallons have been manufactured so far, for test purposes, the company said, but the methods are available should the need ever arise for a fuel of this type.

WASHINGTON WATCHING

BY BERTRAM F. LINZ

Harder to Get

WASHINGTON.—Steel industry spokesmen are warning that steel will be even tighter after the turn of the year than it is now, reflecting both increased demand for actual use and an apparent tendency toward hoarding based on the belief that Marshall Plan and military requirements will cut heavily into supplies next year.

At the moment, steel pipe is the tightest item, harder to get and in greater demand than steel sheets, and some mills now have booked oil-company orders for delivery as far hence as 1953. The steel industry now recognizes the defense implications in the oil situation and has committed itself to producing all the pipe it can.

The accelerated shipbuilding program presents another problem, with demand for plate at a new high and cutting into the supply of semifinished steel for sheets, but right down the list of steel products there is no such thing as an "easy" item.

The steadily tightening supply and a general expectation of further increases in prices—galvanized pipe jumped $6 a ton last month—is seen as leading to hoarding as purchasers, aware that they can sell their steel at any time and probably at a profit, attempt to set up "bank accounts" in steel, hedging against a possible further curtailment of civilian supplies. Even though reports say that some household appliances are not selling as fast as they did a few months ago, manufacturers continue to order and clamor for steel.

The few industries which, like oil, are covered by allocation agreements are fairly well protected, but the heavier export requirements as the European recovery program attains full speed, military expansion and the earmarking of steel for allocations are seen as making precarious the position of the general run of steel consumers.

Aid to Mexico?

A NEW approach to the problem of Mexican oil development may be worked out as a result of the 2-week survey just completed by members of the House interstate and foreign commerce committee.

The committee returned late last week after discussions with Mexican officials and visits to Mexican oil fields where they found that some of the equipment now in use has been in service for as much as 30 years.

The Mexican petroleum monopoly for some months has been attempting to interest United States companies in exploration and development contracts but with little success, because of the rigorous conditions which the larger companies, at least, are unwilling to accept. Drilling contracts which Petroleos Mexicanos was able to place have progressed slowly due to the difficulty of securing drill pipe, casing, and other steel.

There are indications that the committee may recommend that the problem be attacked by a joint United States-Mexican oil commission, supported by a loan of possibly as much as $45,000,000 to enable Mexico to acquire new drilling equipment, pipe, and machinery.

Interest of the committee in the Mexican situation was aroused during its hearings on the fuel situation during the last session of Congress, and in recent reports it has leaned heavily on the thesis that if oil pipe is to be exported for the development of foreign sources of supply it should go, as far as possible, to countries in the Western Hemisphere, particularly at this time, when it feels there is considerable uncertainty as to the uninterrupted flow of oil from the Middle East.

Higher Freight Rates?

ANOTHER increase in petroleum rail freight rates is being studied by the railroads, and a new application for higher rates and for removal of the maximum ceilings on increases previously allowed may be filed with the Interstate Commerce Commission within a matter of weeks.

Railroad officials, reluctant to discuss details, have admitted that the whole freight-rate structure is being considered in an "exploratory" way, but say the studies have not progressed to the point where they could name specific commodities on which higher rates will be requested.

The basis of the next increase to be sought will be present and prospective high operating costs. The railroads now are faced with another round of wage increases and there recently have been sharp increases in materials and other costs.

The railroads have been given several increases in rates since the war, but even so have been unable to keep up with rising wages and operating expense.

It is not expected that the next application to the ICC will call for an across-the-board increase but, rather, for higher rates on bulk commodities such as oil, cement, etc.

All Votes Accepted

THE Department of Justice and the small business committees of House and Senate are in stiff competition for the favor—and the votes—of small business men.

The congressional committees, of course, are headed by Republicans, who have been issuing frequent statements regarding their investigations of the disabilities under which the small business men operate and the gains they have secured with them.

With the Wallace Progressive Party, on the one hand, and the Dixiecrats on the other, threatening to make deep inroads into the Democratic vote, the administration is out combing the underbrush for support, and late last month Attorney General Tom C. Clark called a meeting to which a number of representatives of small-business organizations were invited.

Clark himself did not attend the meeting, but a number of attorneys in the antitrust division, representatives of the congressional small business committees, and officials from other departments were present. The Justice Department's publicity on the 2-day conference was highly uninformative, but men who attended said the government and congressional representatives did the talking and small business just sat and listened.

Possibly the most important development of the session was a pat by the Department of Justice on the back of the Department of Justice for prying supplies of materials loose for small business by threatening to take the producers into court if they failed to come through.

The holding of the meeting indicated that from now until election day the department may be expected to erupt from time to time with announcement of action in behalf of small business, but so far the undisputed champion in that field is Sen. Kenneth S. Wherry of Nebraska, so far as the oil industry is concerned.

Allocation Strings

LEGISLATION to extend Public Law 395, under which voluntary allocation agreements for the oil, steel and certain other industries have been developed, is expected to be introduced early in the next Congress, probably with important limitations upon the authority of the Department of Commerce.

Particularly in the case of steel, there has been widespread criticism of the apparent lack of standards on

which the department bases its determinations whether one industry or another should be given preference.

It is charged that department officials simply started to create allocation programs in certain industrial fields handed to them by the Cabinet or the White House and have expanded the field of consideration to include other industries which have cried out as a result of injury or prospective injury—recognizing that once the cycle starts it cannot be stopped, which may defeat what they set out to do, yet acknowledging that they are not set up to tell many industries that they will be harmed by these preferences, even though harm is inevitable.

The resultant scramble in the free market for the unallocated steel, it has been warned, may defeat the purposes of the act to stabilize prices and bring about the orderly manufacture and distribution of goods.

When the matter comes up in Congress next winter, an effort will be made to incorporate in the act some basic requirements, primarily that determinations of what industries are to be given allocation assistance be based, first, on national-defense considerations.

This would mean that the fuel and transportation industries would have a priority over other industries less essential to the maintenance of the industrial and civilian economy in the event of war. Their importance in the national defense has, of course, been a factor in Department of Commerce considerations, but it is felt in some congressional circles that lack of specific instructions in the law has deterred the department from giving some industries which are important to national defense as much steel as they require because to do so would injure other less essential, but still important, industries.

Continued Conservation Needed, Champlin Says

The oil industry cannot afford to slacken its vigil over the conservation of petroleum products, in spite of its "remarkable job" in meeting the record demand, Ralph Champlin, chairman of the Oil Industry Information Committee, warned last week.

"It does not help the public to understand the true picture of the oil supply situation by headlining in advertisements such statements as 'Oil shortage is over' or 'There will be plenty of heating oil in all parts of the country next winter,'" Champlin said.

Wholehearted response by the public to industry appeals for conservation of heating oil helped the industry through a difficult season last winter in the face of heavy odds, Champlin asserted, adding that the industry still needs that cooperation.

Chemists Told Trend to Continue Toward Higher-Octane Fuels

by C. O. Willson

ST. LOUIS.—Refiners of petroleum and those connected with allied manufacturing activities of the oil industry can look forward to demands for still higher antiknock gasolines from their customers.

This future trend in the specifications of motor fuels applying to the principal uses appeared certain from the discussions of technologists presented here September 6-10 at meetings sponsored by the Division of Petroleum Chemistry of the American Chemical Society. While most of the papers in a symposium on "Relation of Fuel Properties to Engine Design and the Future of High-Octane Fuels" dealt with production practices, methods of testing, and utilization, other authors discussed the economic phases. They agreed that high-octane gasolines coordinated with higher compression ratios in engines are a logical development of present and future needs in motor fuel performance.

GUSTAV EGLOFF
Division Chairman

Better Economy, Performance

J. M. Campbell and L. L. Withrow of General Motors Corp. presented additional data supporting the well-known position of that company that higher octane fuels and higher compression engines mean better car performance and economy for users.

The authors said that from 1930 to 1947 compression ratio averages increased from 5 to 1 to 6.7. This represents an increase of about 4 per cent in engine efficiency but is equivalent to a change in fuel consumption of 14 per cent.

"Gains in fuel economy in the order of 10 to 25 per cent are possible with compression ratios set for octane levels not much above those established by some premium gasolines" the authors explained. "Even greater gains can be made by adjusting the compression ratios for still higher octane number levels."

The two authors concluded: "We believe that gains running as high as 40 per cent in fuel economy without loss in performance are sufficient to offset a considerable increase in cost of fuel and that such gains merit the consideration of the petroleum industry."

Pointing out that the mechanical barriers in the design of engines with compression ratios up to 12.5 to 1 have been solved, W. C. Offutt, J. E. Taylor and G. B. Swartz, Jr., of the Gulf Research & Development Co., opened their discussion with the assumption that it is now the duty of oil industry to perfect fuels suitable for the new engines that can be made available.

The authors, whose paper was devoted to a study of fuels in high compression engines, pointed out that answers must be found to several questions regarding gasoline properties before the coordination with high-compression engine performance can be attained. Their work included a comparison of all portions of fuels under consideration and the results obtained by blending fuels from the available refinery components. A complete hydrocarbons analysis for the fuels rate was a part of this study.

Fuel Requirements

According to J. B. Duckworth, G. T. Moore and C. J. Domke of the Standard Oil Co. (Ind.) users are accustomed to evaluate the antiknock performance of a fuel at low speeds. They presented a correlation between road tests of new type engines and laboratory tests with the conclusion that the best correlation is between the road ratings and the research octane number of the laboratory as modified by motor ratings.

A 93 research number fuel is suitable for a 8-to-1 compression ratio engine and a 102 research octane number will give satisfactory service in a 12.5-to-1 compression engine according to the generalized findings of R. W. Scott, G. S. Tobias and P. L. Haines of the Standard Oil Development Co. These authors in their investigations used 16 gasolines varying in octane ratings, composition and lead content with engines having 8, 10 and 12.5 to 1 compression ratios. In connection with their findings relative to the relation of engine performance and octane rating the au-

Abstracts of A. C. S. Petroleum Division papers may be found on page 83.

thors observed that in the exceptionally high compression ratio engines the octane number is limiting and fuels of greater laboratory appreciation can be tolerated as the compression ratio is increased.

The production of two grades of fuel for use in a bifuel system, now being investigated experimentally by manufacturers, was the background for a paper prepared by C. V. Hill, H. T. Lorne, and A. R. Mercer of Anglo-Iranian Oil Co., Ltd., on the refining of gasolines from Middle East crude oil. The company has a production of nearly 500,000 bbl. daily in Iran and at Abadan, Iran, operates the world's largest refinery.

The authors pointed out that owing to the heavy demand for the middle distillates and residual fuels they cannot depend on the cracking of these cuts to improve octane ratings of their gasoline but must rely on methods largely confined to the further treating and processing of straightrun-gasoline fractions.

Refining Methods

The expansion of catalytic cracking is the result of the necessity of increasing octane ratings, according to a paper by A. A. Draeger, G. T. Gwin, C. J. G. Leesemann, and W. R. Morrow of Humble Oil & Refining Co. This operation, it was explained, produces the isoparaffins, aromatics and isoolefins which come within the boiling range of commercial gasoline.

The authors pointed out that in addition to the distillation of straightrun gasoline from crude there are three methods of increasing gasoline yields which are also directly related to octane ratings.

These are: (1) thermal or catalytic cracking of molecules of higher molecular weight than those required for gasoline; (2) the condensation, polymerization or alkylation of compounds lighter than gasoline, and (3) the rearrangement or structural alteration of compounds within the gasoline boiling range.

After presenting theoretical considerations involved in these operations, the authors outlined the commercial applications with particular reference to the octane ratings of the gasoline recovered. An interesting table was included giving representative results in the application of processes which now have commercial applications. The accompanying table presents these data.

Halogenation of Hydrocarbons

Nine papers were presented at the meetings of the chemistry division devoted to the Halogenation of Hydrocarbons and Properties of Products. Several additional papers of particular interest to those engaged in refinery and petrochemical research were given at other sessions. Abstracts of most of these papers are published in this issue.

PROCESSING GASOLINE FROM CRUDE PETROLEUM*

Primary crude distillation—	Yield, vol. per cent of crude	Primary crude distillation—	Yield, vol. per cent of crude
C_4-and-lighter and loss	1	Lube stock	7
C_4-400° F. gasoline	25	Residuum	18
Kerosine stock	12		
Gas oil	37	Total	100

CUMULATIVE PROCESSING SEQUENCE FOR INCREASING GASOLINE YIELD AND QUALITY

Step No.	Operations—	C_4-400° F. gasoline: Yield, vol. pct. of crude	Research octane No.	A.S.T.M. motor octane No.
1.	C_4-400° Virgin naphtha from crude	25.0	55	53
2.	Add thermal cracking of			
	(a) Gas oil	15.0	70	63
	(b) Residuum	2.7	67	60
	Cumulative total	42.7	61	57
3.	Replace thermal cracking of gas oil with catalytic cracking	16.9	93	79
	Cumulative total	44.6	70	63
4.	Add thermal reforming of 200°-400° F. virgin naphtha	11.7	80	70
	Cumulative total	39.1	83	73
5.	Replace thermal reforming of 200°-400° F. virgin naphtha with hydroforming	15.0	82	73
	Cumulative total	42.4	84	74
6.	Add nonselective polymerization of butylenes and propylene	2.4	98	83
	Cumulative total	42.2	84.5	74.3
7.	Replace nonselective polymerization of butylenes and propylene with alkylation of butylenes, pentylenes, and propylene	7.6	92	91
	Cumulative total	42.8	85	76
8.	Remove by superfractionation of virgin naphtha: Normal pentane, normal hexane, and normal heptane cuts	(4.8)	52	51
	Cumulative total	37.0	89	80
9.	Add isomeration of			
	(a) Normal pentane (to ultimate yield)	1.4	88	87
	(b) Normal hexane (once-through)	2.2	81	80
	Cumulative total	40.6	89	80
10.	Remove raffinate obtained by SO_2 extraction of hydroformates	(3.5)	35	34
	Cumulative total	37.1	94	84
11.	Add thermal reforming of above raffinate and nC_7 cut from virgin naphtha	2.7	74	64
	Cumulative total	39.8	92.5	83
12.	Add vacuum flashing and deasphalting of residuum to obtain 14 per cent additional heavy gas oil from crude for catalytic cracking. Catalytic cracking of this gas oil produces additional naphtha and additional light ends for alkylation. Cumulative gasoline pool becomes:			
	C_4-400° F. naphtha from catalytic cracking	22.4	92	78
	Alkylate (total butylenes, pentylenes, propylene)	11.6	92	91
	Superfractionation and isomerization products:			
	Isopentane	3.6	88	88
	Isohexanes	3.6	81	80
	Isoheptane fraction	3.1	72	71
	Extracted hydroformates:			
	Toluene	1.8	120	110
	Xylenes	3.5	140	120
	Heavy aromatics	2.9	100	80
	Thermally reformed raffinate (includes nC_7 fraction from virgin naphtha)	2.7	74	64
	Subtotal	54.7	94	84
	Add extraneous normal butane for 10-lb. R.V.P.	6.0	95	95
	Total gasoline pool	60.7	94	85
13.	Withdraw for 100/130 grade aviation gasoline:			
	Butylene alkylate	4.4	94	94
	Isohexane-isoheptane naphtha fractions	6.6	76	75
	Isopentane fraction	2.0	88	88
	Total 100/130 aviation gasoline (with 4 cc. TEL/Gal.)	13.0	85	84
	Remaining gasoline pool	47.7	..	..
	Back out extraneous normal butane for 10-lb. R.V.P.	0.8	95	95
	Final motor gasoline pool	46.9	97	85
	With 1 cc. TEL/Gal.	...	100	88

*From "Production of High-Octane Gasoline Components," by A. A. Draeger, C. J. G. Leesemann, and M. R. Morrow, Humble Oil & Refining Co., Baytown. Division of Petroleum Chemistry, American Chemical Society, St. Louis, September 6-10.

International

WORLD-WIDE OIL DEVELOPMENTS

Oil Industry in Japan Now Being Returned to Private Enterprise

WASHINGTON.—The first steps toward returning the Japanese oil industry to private enterprise were taken by Gen. Douglas MacArthur September 3, on the third anniversary of Japan's surrender.

A report of the Civil Affairs Division of the War Department from Tokyo denominated this as one of two "significant moves" to "democratize the Japanese economy." The same order provided for a limited return of shipping to private hands, but did not mention tankers.

British sources August 9 said two Japanese manned and officered tankers left Japan for Iran during the first week of August to replace American tankers on the Iran-Japan oil run, marking the first time since the war that the Japanese merchant navy has been permitted in a foreign field. The decision to permit Japanese tankers to use the world's sea lanes was reached at the recent sterling area conference in Tokyo, the sources said.

To Be Gradual

The building up of a private oil industry will be accomplished gradually, the first facilities to be turned over being ocean terminal storage for petroleum required to supply the Japanese economy.

Japanese consumers will continue to be supplied according to existing systems of controlled allocations and ration cards by the petroleum distribution kodan, a Japanese Government agency, and allied personnel will continue to be supplied by U. S. Army sales stations.

The report stated that it is anticipated that filling stations will be opened shortly in the Tokyo-Yokohama area by a Shell Oil Co. affiliate, Standard Vacuum Oil Co., and Caltex Japan, Ltd.

The release of inland storage and distribution facilities in addition to ocean terminal storage will follow later to "complete the return to private operation and free enterprise of this industry which represents capital assets of many millions of yen," MacArthur's headquarters reported. There also will be a gradual transition from government to private control of the industry, it was said.

Trinidad Planning Big Exploratory Program

An estimated $5,000,000 will be spent on exploratory drilling in Trinidad during the next 2 years. An additional $5,000,000 is expected to be spent in the purchase of new equipment during that period, according to W. A. Foster, government petroleum technologist.

Optimism is being expressed by the island's oil industry in view of the recent British announcement that steel allocations to the West Indies will be doubled during the fourth quarter of this year.

Four Countries Issued Oil-Purchase Permits

WASHINGTON.—Commitments for the procurement of oil for the Marshall Plan countries were issued last week by the Economic Cooperation Administration, as follows:

Greece, $308,700 for motor gasoline and $176,000 for diesel oil, to be procured in the United States through the Navy Department.

France: $161,000 for petroleum coke from the United States and $210,000 for spare parts for oil drilling equipment.

Norway: $2,528,152 for gas oil, kerosine, diesel oil, fuel oil and gasoline from the Dutch West Indies.

China: $20,883 for diesel oil from the United States; $27,683 for diesel oil from Saudi Arabia; $286,917 for aviation gasoline from the United States; $946,257 for motor gasoline and fuel oil from Saudi Arabia; $5,854,178 for aviation gasoline, motor gasoline and diesel oil from Saudi Arabia, and $864,081 for aviation gasoline, lubricating oil, grease and diesel oil from the United States.

Italy Expected to Ask For Drilling Equipment

WASHINGTON.—Economic Cooperation Administration officials anticipate that Italy will ask this month for funds with which to purchase American drilling equipment to further the search for oil and natural gas now going on in Sicily and the Po Valley.

Traditionally dependent upon coal imports for fuel, Italy hopes to discover enough oil to make unnecessary the purchase in other countries of the 12,000,000 to 13,000,000 tons of coal a year needed to supplement its own meager production. Before the war, Italy was producing something less than 2,000,000 tons of hard fuel a year, but hopes to boost output to well over 3,000,000 tons in 1949 although even that figure will not tend to reduce the imports needed by her expanding industrial economy.

The development of an oil industry is one of five major long-range programs which Italy purposes to undertake with the aid of Marshall Plan funds. The other projects are housing, expansion of hydroelectric power, land reclamation and soil conservation, and improvement of transportation and hotel facilities to attract tourist revenue.

Several major companies and a number of independents are reported to be exploring Italian oil possibilities.

Colombia Senate Modifies Plans for Products Lines

Plans for 250 miles of products pipe lines have been modified and approved by the Senate Oil Committee of Colombia in considering a bill held over from the 1947 session.

This bill provided for financing the

construction of a 140-mile products pipe line from La Dorada to Cartago to cost $2,000,000 and a 110-mile products line from La Dorada to Bogota to cost $1,425,000.

These two lines totaling 250 miles have been planned to extend from a 92-mile products line from Puerto Berrio to La Dorada for which the Colombian Government has contracted with the consulting and construction firm of Acosta & Madero Paris for the preparation of complete engineering plans and estimates.

It is intended that this 92-mile line would connect with Tropical Oil Co.'s Barranca Bermeja 60-mile products line built in 1947.

Wild Well in Leduc Field Catches Fire

Leduc field's wild well, Atlantic No. 3, a fire hazard since it blew in March 8, caught fire September 6, still defying months of efforts of the oil industry and the Alberta Government to bring it under control.

Water this week was being pumped into relief well No. 1 at the rate of 3,360 bbl. per day in an effort to flood the area from which No. 3 is producing. The second relief well, bottomed once and later plugged back to redrill from 3,700 ft., following a twistoff, this week was attempting to free stuck drill pipe.

The area has been closed to the public since shortly after the well was brought in, when gas broke through the ground in a wide area around the well flooding a 40-acre area with oil. The well last week still was producing 8,000 to 9,000 bbl. of oil daily.

Caltex Begins Work On Rotterdam Refinery

Construction has begun on the new Caltex 20,000 to 30,000-bbl. daily refinery at Rotterdam. The project of Standard Oil Co. of California and The Texas Co. is expected to be completed in 1950. The new plant is a part of the large-scale program undertaken by Caltex to establish refineries throughout Western Europe.

With the construction of two jetties, the Rotterdam Caltex refinery will be able to accommodate tankers of 22,000 tons. For the time being, these tankers will load at Bahrein, but as soon as the new pipe line across Palestine has been completed, oil will be taken on board at Haifa, resulting in an expected saving in transportation costs of 33⅓ per cent.

The refinery's exportable surplus will be shipped to Scandinavia, Germany, Austria, and Belgium. Plans are presently under way by the company for construction of a refinery in Bordeaux with an output of 80,000 bbl. daily and later another plant in Italy.

The Caltex plant, one of the largest outside the Western Hemisphere, is the second refinery to be established at Rotterdam. The other one belongs to Batavia Petroleum Co., which currently has a capacity of 30,000 bbl. of crude oil daily. This company hopes to double its output by the end of this month when extensions to its Rotterdam plant are to be completed.

India Conducts Studies On Synthetic Oils

The Indian Minister of Industry and Supply has entered into negotiations with an American firm for the preparation of a report on the possibility of manufacturing synthetic oil and benzol in India.

The Petroleum Institute of France has also cooperated in the study. Negotiations are in progress to get one or two German specialists to advise the government.

Czechoslovakia Has Motor-Fuel Shortage

A "serious shortage" of motor fuels in Czechoslovakia has made necessary the tightening of rationing controls and further restriction of licenses. The government has announced that the shortage makes it necessary to reduce by 50 per cent the number of cars, motorcycles, and trucks on Czechoslovakian roads.

Essential public services and the farming community, however, will not be affected. Official government statistics have not given any indication of reduced imports or production of gasoline. However, some observers have expressed the belief that Czechoslovakia is either cutting imports or building up reserves.

Tunisia May Grant Prospecting Concessions

Shell Transport & Trading Co., Ltd., has asked the French Government for permission to form a company to prospect for oil in Tunisia, according to an official of Shell-Berre, a company formed by the merger of Jupiter and Raffineries Berre.

According to an official of the Ministry of Commerce and Industry, the French Government is considering the granting of prospecting concessions in Tunisia to foreign petroleum companies. He declined to name the companies concerned. A Paris report said that Gulf Oil Corp. had asked for a concession for seabed prospecting around the Kerbeuh and Djerba islands off the coast of Tunisia.

VENEZUELANS STUDY CONSERVATION METHODS

Seven Venezuelan petroleum engineers who have completed advanced studies at petroleum engineering schools in the United States now are studying conservation and proration methods with the Texas Railroad Commission under the direction of Jack K. Baumel, seated, chief engineer. Baumel is scheduled to go to Venezuela this autumn on a year's leave of absence from the commission as chief consultant engineer to advise the Venezuelan Government in its plans to set up a similar conservation department. Shown in the picture are, left to right, Luis Lopez, Luis Plaz, Rafael Guariguata, Jose Gil, Gaston Pernalete, Baltazar Gimon, and Amos Pifano

Bolivian Program Aimed at Supplying Country's Oil Needs at Lower Cost

by Guillermo Mariaca

In this article Guillermo Mariaca, general manager of Yacimientos Petroliferos Fiscales Bolivianos, government-owned operating organization, explains the program under way to expand all divisions of petroleum operations in Bolivia. Mariaca is a graduate in petroleum engineering from the University of California. Previous to the appointment to his present position he served Y.P.F.B. as field engineer, chief petroleum engineer, administrator, and president of the board.

At present Y.P.F.B. has three producing fields—Camiri, Sanandita, and Bermejo — producing approximately 1,500 bbl. of crude oil daily. Eight wells are drilling in Camiri field and one in Sanandita field. The cumulative production is approximately 4,000,000 bbl. The topping plant located in Camiri field has a capacity of 1,400 bbl. daily, and the topping plant in Sanandita field, 500 bbl. daily.

IN 1937 when the Bolivian Y.P.F. took over the petroleum industry of Bolivia, there were a number of oil fields that were proven by exploratory drilling. None of these fields had been developed by drilling a sufficient number of test wells in order to be certain whether they were commercially productive. Moreover, these test wells served only to show the presence of oil in some of the structures, but gave very little information as to the amount of the reserves and their relative quality. Therefore, in the years following expropriation, Y.P.F.B. faced three main problems:

1. To obtain oil products in sufficient quantity to supply the country's needs;

2. To produce oil products at prices sufficiently low to contribute to the industrial development of the country;

3. To produce oil for export in order to improve the foreign exchange situation.

Solution of these problems required, in the first place, a thorough study of the oil situation, followed by the application of measures designed for the execution of the plan that, as a result such a survey, should be put into effect. Although the first objective seemed to be the easiest to attain, in practice it was the most difficult phase of the problem. In 1941 the United States Government sent a mission to Bolivia. The work of this mission was hampered by the lack of adequate surveys, data, and knowledge to enable its members to properly advise regarding this problem. In the first place, the amount of the reserves of the fields operated by Y.P.F.B. was not known. There was no information as to the means of transportation from the producing fields to the consumption centers, and it was thought at the time that the transportation of oil by pipe line raised a very difficult problem. In view of these circumstances, the Bohan mission limited its scope to recommending a temporary plan which would partially relieve Bolivia's need to import oil products for local consumption.

This plan called for the development of Sanandita field and transportation of products to the centers of consumption located in the plateau by way of Argentina. The plan was carried out only in part because drilling activities in Sanandita confirmed what had been predicted as to the inadequacy of reserves in the field. Other factors hindered the development of the plan, such as the entry of the United States into the war, the consequent friction with Argentina, and the difficulty in obtaining materials in the required quantities.

In the meantime, Y.P.F.B. concentrated its efforts in the evaluation of its reserves. As a result it was found that only Camiri field had reserves of sufficient quantity to justify the capital investment necessary to obtain the above-mentioned objectives.

The reserves were calculated by geologists of recognized ability. They all agreed on an estimate of 20,000,000 bbl. Subsequent drilling has not only confirmed the above figure, but has raised it to 28,000,000 bbl.

This gave us the opportunity to select the field that was to be developed, but the problem of transportation was still to be solved. It is a well-known fact that next to tanker transportation pipe lines offer the most economical method. However, against the proposed line from Camiri it was argued that the nature of the terrain and the limited market to be served made quite inadvisable the investment required, which was estimated at $20,000,000. Y.P.F.B. made a careful survey of the project and ascertained that the cost of it would be from $6,000,000 to $8,000,000 and that the investment was justified.

Construction under way on pump station No. 1 in Camiri field. Workers are shown mounting one of the engines at the station, which will operate on the 255-mile, 6-in. line from Camiri field to Cochabamba being built by Williams Brothers Co.

At this stage the problem still to be solved was that of financing the program, including the construction of a pipe line and development of the Camiri production.

From these studies and the established premise that Bolivia's problem was: (1) to supply oil products for domestic use, and (2) to produce oil for export, the following program had been decided upon:

1. The only field which justified large investments was Camiri field and, therefore, the one to be developed to the extent of assuring a minimum production of 3,000 bbl. daily.

2. Test wells had to be drilled in the most promising structures near Camiri (Guairuy and Mandeyapecua), and $2,000,000 have been allocated for drilling 50 wells in those structures. Several wildcats have been drilled and $1,000,000 invested in rigs and materials.

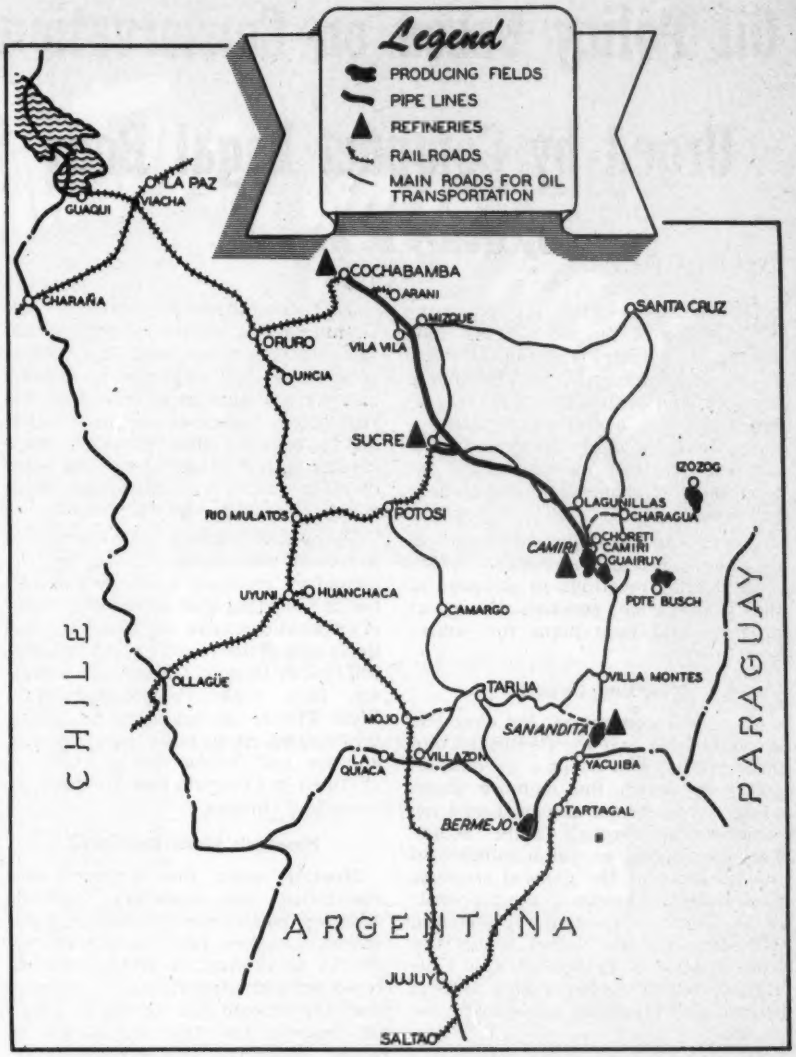
3. Construction of a pipe line from Camiri to the city of Cochabamba at a cost of $6,550,000.

4. Construction of a branch pipe line from a point near Lamboya to the city of Sucre.

5. Construction of a 3,000-bbl. topping plant at Sucre.

6. Construction of another 5,000-bbl. refinery at Cochabamba, equipped to produce high-octane aviation fuel. Both refineries will be erected at an approximate cost of $4,475,000.

Y.P.F.B. decided on the construction of two refineries instead of one to satisfy the demands of the people of Sucre. Negotiations for a loan from the Export and Import Bank were rather difficult, and the bank has refused to undertake the financing of the Sucre refinery project as it considers it uneconomical.



Map of Bolivia showing location of producing fields, pipe lines, and refineries

Profit Expected

The development of the entire program is calculated to bring a net profit of $4,000,000 by 1949, which will progressively increase as the oil consumption of the country continues to rise. The project will save the nation $3,000,000 yearly in foreign exchange, which saving will also continue to increase progressively. It is interesting to note that these figures take into consideration a decrease in the sales price of oil products such as diesel fuel, fuel oil, and kerosine. Diesel fuel sells now for as much as 3.80 bolivianos per liter; later it will be sold at 2.00 bolivianos. Fuel oil, now 2.50 bolivianos, will sell later at 1.50 bolivianos. Price of kerosine will be lowered by 0.50 bolivianos per liter in all zones served by the pipe line.

As soon as Y.P.F.B. has paid the debt incurred in financing the project prices will be lowered still more, if necessary.

The program calls for an over-all investment of $14,150,000 of which $3,500,000 will be borrowed from the Import and Export Bank, $5,000,000 from the Central Bank of Bolivia, and the remaining $650,000 are notes guaranteed by the Central Bank now issued to Williams Brothers for liquidation when the program is completed.

This program has been approved by decree of the national government dated October 24, 1946. It has been carefully studied by the Import and Export Bank, and with the exception of the Sucre refinery it has been approved by the bank as the most acceptable under the present circumstances. On the basis of these plans the bank has increased the original loan by $3,000,000.

Construction work will be finished in 1948, including the refineries at Cochabamba and Sucre. The entire project will make it possible for 80 per cent of the local demand to be supplied from Camiri oil, including 75 per cent of the aviation fuel needs. Should heavier crudes be found in Guairuy and Mandeyapecua, 100 per cent of the national requirements will be met. This goal will not be attained, of course, until 18 months after the program has gone into productive operation, at which time development of the Bermejo field will also be undertaken.

Y.P.F.B. will set aside 75 per cent of its profit to amortize the loan. It is estimated that within 3 years it will be almost paid for, in view of the fact that the Import and Export Bank contract aims at short-time liquidation.

The problem of developing oil production for export is left as the second phase of the Y.P.F.B. program. Its cost will be considerably higher than the development of crude production. In order to provide oil for export, fields larger than Camiri must be discovered, for Bolivian oil must successfully compete with oil from other countries.

International
WORLD-WIDE OIL DEVELOPMENTS

Oil Policy Based on Conservation Urged by Compact Legal Body

by Henry D. Ralph

NEW YORK.—Better public understanding of the work being done by the oil industry and the oil states in meeting demands for petroleum products and at the same time achieving maximum conservation was the main theme of many speakers at the summer quarterly meeting of the Interstate Oil Compact Commission here last week.

It was also the objective of several of the standing committees which held regular meetings in advance of the Commission sessions to report progress and map plans for winter activities.

Hoarding Opposed

The legal committee, for example, recommended that the Compact Commission draft and adopt a national oil policy to which the member states could subscribe, a policy based on conservation through state action. This committee, as did a number of the speakers at the general sessions, took violent objection to the proposals in a recent book called "A National Oil Policy for the United States" by Prof. Eugene V. Rostow of Yale University, which recommended federal control and hoarding of domestic resources.

The proposal for a national policy declaration is expected to receive attention at the next meeting of the Commission, the place and date for which will be set later by the executive committee. This next meeting also probably will have before it an entirely new draft of a model state oil and gas conservation statute which is being prepared by the legal committee. The committee reported that it plans to have the draft completed in time for consideration by state legislatures which meet early in 1949.

Somewhat the same theme was embodied in the report of the regulatory practices committee, which stated: "The oil and gas industry and the public are not fully aware of the work being accomplished by the state regulatory agencies. The committee is of the opinion that the industry and public approve of the type of administration in the various states from the standpoint of easy access, the opportunity for consultation or discussion of various problems, the opportunity for hearings to decide issues, and the availability of detailed information on oil and gas operations."

This committee presented to the commission a summary of the administrative rules and regulations concerning oil and gas production and conservation as practiced by the regulatory bodies of member states, and announced that it will request similar information from the nonmember states of California, Wyoming, Nebraska, and Missouri.

The public interest in conservation practices was stressed also by the secondary recovery advisory committee in reporting that secondary recovery operations have increased the nation's petroleum reserves by 5,000,000,000 bbl. in Illinois, Oklahoma, Arkansas, New York, Pennsylvania, and West Texas. In addition, the committee said, it is quite possible that another half billion barrels will be obtained in Colorado and Montana by secondary means.

Research Work Reviewed

Meeting with the stripper well committee, the secondary recovery advisory committee reviewed the research program recently started by the U. S. Bureau of Mines, and offered several suggestions. It reported that the Bureau has agreed to adopt its requests for study of tracers in water flooding, selective plugging, use of explosives in shooting wells, and washing oil sands. The committee will continue its studies in typical fields which are amenable to stimulating methods, such as KMA field in Texas, where the Bureau of Mines studies were said to be especially helpful in conserving the remaining oil, and in the Appalachian area where cooperative work on problems of particular interest is being expanded.

The definition of "stripper well" was considered by this group, with the conclusion that no narrow legal definition would be satisfactory but that the term should have a broad meaning which can be readily understood by any oil operator. On this subject the committee reached the following three conclusions:

1. Since the term "stripper well" was first evolved in the early 1930s, no simple, adequate definition has been developed. The term "stripper well" is a concept which every oil man understands, but which virtually defies explicit definition because it is the resultant of many factors. Just as individuals differ one from another, so do oil wells differ in making up the concept of a stripper well.

2. A stripper well is not merely a matter of depth, or of age, or of barrels per day, or of geographical location, or of permeability, or porosity, or even of profit or loss. What may be considered to be a nonprofit or marginal well may be placed in another category by changing conditions. Therefore it is impossible to make a clear-cut descriptive statement of the circumstances. Neither can such wells be defined on the basis of energy relations and mathematical formulas, although these are pertinent factors.

3. The consensus of the committee members at the New York City meeting is that for purposes of discussion the terms "marginal" and "stripper" wells should not be narrowly defined, but that a broad interpretation should be maintained in line with the generally recognized concept in the industry pertaining to this class of wells. An analysis of the pertinent factors applicable to a particular well readily enables the experienced oil man to classify a well as a stripper or nonstripper well.

Third Advisory Group On Allocation Named

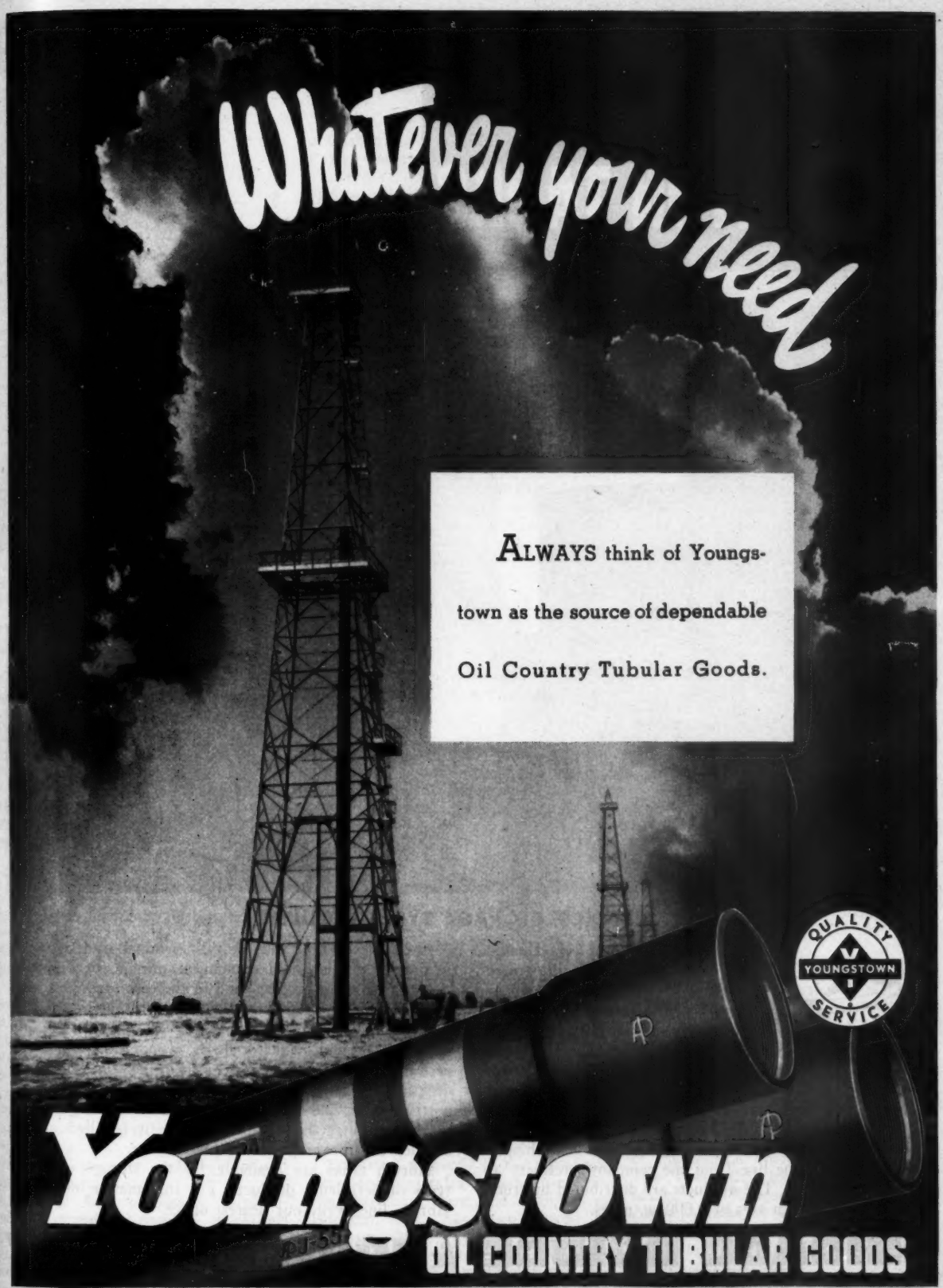
MEMBERSHIP of the District 3 advisory committee which will operate under the voluntary allocation agreement has been announced by Walter S. Hallanan, chairman of the National Petroleum Council.

John W. Newton, vice president of Magnolia Petroleum Co., Beaumont, Tex., is chairman of the District 3 committee.

Membership in the Districts 1 and 2 committees, headed by B. I. Graves, vice president of Tide Water Associated Oil Co., and B. L. Majewski, vice president of Deep Rock Oil Corp., was published in the August 26 issue of The Oil and Gas Journal, page 86.

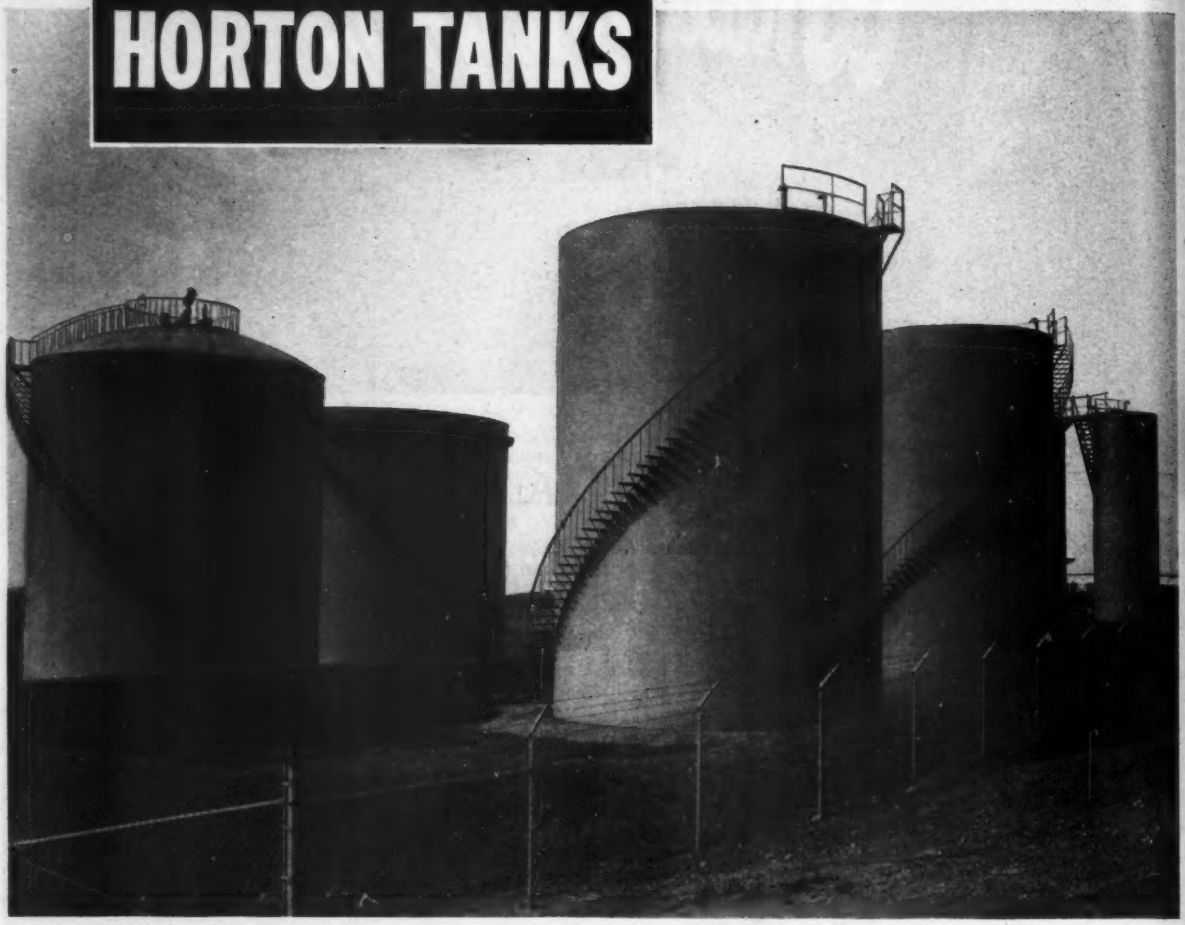
Members of the District 3 group include:

R. B. Anderson, W. T. Waggoner Estate, Vernon, Tex.; Robert O. Anderson, Malco Refineries, Inc., Roswell, N. M.; D. G. Gray, Humble Oil & Refining Co., Houston; John A. Bartlett, American Mineral Spirits Co., Corpus Christi; M. W. Boyer, Esso Standard Oil Co., Baton Rouge, La.; J. M. Bradshaw, Hercules Oil Co., Dallas; L. D. Mann, Cities Service Refining Corp., Lake Charles, La.; T. M. Martin, Lion Oil Co., El Dorado, Ark.; Maston Nixon, Southern Minerals Corp., Corpus Christi; G. L. Rowsey, Taylor Refining Co., Taylor, Tex.; T. E. Swigart, Shell Pipe Line Corp., Houston; Raymond L. Tollett, Cosden Petroleum Corp., Big Spring, Tex.; C. M. Bryson, McMurrey Refining Co., Tyler, Tex.; Joe Hyer, Root Petroleum Co., Shreveport; Parker Kendall, Sinclair Refining Co., Houston; H. S. Lane, Crown Central Petroleum Corp., Houston; J. Sayles Leach, The Texas Co., Houston; Merrill H. Utley, Standard Oil Co., Jackson, Mississippi; W. M. Vaughey, Vaughey & Vaughey, Jackson, Miss.; F. L. Wallace, The Texas Co., Port Arthur, Tex.; and B. F. Wehrenberg, Gulf Refining Co., Birmingham, Ala.



THE YOUNGSTOWN SHEET AND TUBE COMPANY
General Offices — Youngstown 1, Ohio
Manufacturers of Carbon, Alloy and Yoloy Steel
Export Office - 500 Fifth Avenue, New York
PIPE AND TUBULAR PRODUCTS - CONDUIT - BARS - RODS - COLD FINISHED CARBON AND ALLOY BARS - SHEETS - PLATES - WIRE - ELECTROLYTIC TIN PLATE - COKE TIN PLATE - TIE PLATES AND SPIKES

Pipe line terminal equipped with HORTON TANKS



VARIETY OF STORAGE TYPES REQUIRED

Three types of Horton storage tanks are illustrated in the above view of the Socony-Vacuum Oil Company's terminal at Irwin, Pa. They are: (from left to right) an 8,700-bbl. Hemispheroid, a 15,448-bbl. Horton Double-Deck Floating Roof tank, and two cone-roof tanks. The terminal handles an annual volume of 15,000,000 gallons of gasoline, diesel fuel oil and kerosene, which is shipped to Irwin by pipe line from the company's refinery at Paulsboro, N. J. The products are distributed by truck to dealers over an area of 1,600 sq. miles.

Each one of the tanks at this terminal is designed to provide efficient and economical storage for a particular petroleum product, and in the case of the more volatile ones, to keep evaporation and filling losses at a minimum. The Hemispheroid, for example, is a pressure storage tank which reduces evaporation loss by permitting a pressure to build up the inside. The double-deck floating roof tank, used to store gasoline that does not boil at normal atmospheric temperatures, is particularly useful at this terminal, where it is filled and emptied on an average of 28 times a year.

Horton tanks are available for the storage of all types of petroleum products. For information on the Horton line, write our nearest office.

CHICAGO BRIDGE & IRON COMPANY

Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY and GREENVILLE, PENNSYLVANIA

Chicago, 4.....2128 McCormick Bldg.
New York, 6.....3347-165 Broadway Bldg.
Cleveland, 15.....2204 Guildhall Bldg.
Los Angeles, 14.....1423 Wm. Fox Bldg.
Boston, 10.....201 Devonshire St.
Atlanta, 3.....2154 Healey Bldg.
Birmingham, 1.....1536 North 50th St.
Tulsa, 3.....1606 Hunt Bldg.
Houston, 2.....2119 National Standard Bldg.
Seattle, 1.....White-Henry-Stuart Bldg.
Philadelphia, 3.....1615-1700 Walnut Street Bldg.
Havana.....402 Abreu Bldg.
San Francisco, 11.....1254-22 Battery Street Bldg.
Detroit, 26.....1514 Lafayette Bldg.
Salt Lake City, 1.....First Security Bldg.

REPRESENTATIVES AND LICENSEES

Horton Steel Works, Limited, Fort Erie, Ontario, Canada
Leopoldo Sol & Cia., Reconquista 558, Buenos Aires, Argentina
Ateliers et Chantiers de la Seine Maritime, Paris, France
Compania Tecnica Industrie Petroli, S.A.I., Rome, Italy
Whessoe, Limited, Darlington, England
Motherwell Bridge & Engineering Company, Limited, Motherwell, Scotland
Constructions Metalliques de Provence, Arles-sur-Rhone, France
Chicago Bridge & Iron Company, Limited, Apartado 1348, Caracas, Venezuela

PERSONALS

Sun's Chief Engineer Has Long Refining Experience

CHIEF engineer of the manufacturing department of Sun Oil Co., which currently has a $16,000,000 expansion program under way at the company's Toledo, Ohio, refinery, is Paul D. Barton. Since 1934, at which time Barton joined the company, he has been responsible for the design of all light hydrocarbon recovery and fractionation plants at Sun's refineries.

Early last year Barton was appointed chief engineer of the manufacturing department of Sun to succeed Clarence H. Thayer, who was elected vice president in charge of manufacturing.

Barton, who holds 15 patents, among them patents held jointly with others on the original hot contact filtration process for the manufacture of lubricating oils, is a graduate of the University of Oklahoma and the California Institute of Technology. Following his graduation in 1920 from the latter he joined General Petroleum Corp., Los Angeles, where he engaged in research and development on lubricating oils.

In 1923 Barton became superintendent of natural-gasoline operations for United Oil Co. (later Richfield) in Signal Hills field. He resigned from Richfield 3 years later to become a consulting chemical engineer in the design and construction of natural gasoline extraction plants both in the field and in refineries.

Barton, who is author of the section on gas stabilization and recovery in the textbook "Science of Petroleum," published by the Oxford University Press, was the first president of the California Natural Gasoline Association.

H. G. Swanson, manager of Shell Oil Co., Inc.'s, Chicago marketing division, has been appointed general sales manager for the area east of the Rocky Mountains. He succeeds **Harry Jacobs,** who has been named executive assistant to **P. E. Lakin,** marketing vice president.

Louis Weltman, formerly geologist in the Jackson, Miss., office for Lion Oil Co., has been named district geologist for the company's new district land and geological office in Corpus Christi, Tex. **C. L. McArthur, Jr.,** who is district landman at the company's Abilene, Tex., office, will be in charge of the Corpus Christi office as district landman there.

P. C. Thomas, manager of Shell Oil Co., Inc.'s, southern California marketing division, has been transferred to San Francisco as general sales manager. **R. D. Stetson,** operations manager in San Francisco, has been named to succeed Thomas.

J. M. REIDY

James M. Reidy, formerly manager of the district sales office at Houston, Tex., for the past 4 years, has been promoted to sales manager of the natural - gasoline sales division of Warren Petroleum Corp., with headquarters in Tulsa. He has been succeeded by **Fred Creel,** formerly in the sales division office in Tulsa. Reidy, who joined Warren in 1938, in becoming sales manager fills a position which has been vacant since **Sam I. Hulse** was named vice president in charge of the natural-gasoline sales division several years ago.

Ed Voice, formerly in the liquefied-petroleum-gas sales division for Warren Petroleum Corp. and stationed at Houston, Tex., has been moved to Midland, Tex., where he will be in charge of the company's recently established liquefied-petroleum-gas district sales office. Voice has been succeeded by **Richard Brewer,** formerly in the company's materials department at Tulsa and will serve directly under **K. T. White,** manager of Warren's liquefied-petroleum-gas sales office in Houston.

Joe W. Benn, buyer in the production office at Houston for Shell Oil Co., Inc., has been named assistant representative in the purchasing stores office of the Tulsa area to succeed **H. A. Larson,** who was recently transferred to Houston as purchasing stores representative.

W. C. BURNS

W. Chalmers Burns, recently retired president of Richfield Oil Corp. of New York, has been elected president of Hartol Petroleum Corp., large marketing company on the Atlantic Seaboard. He succeeds the late Raymond M. Parker, Jr. Burns with **Ralph W. Walsh,** organized the Walburn Petroleum Co., which later merged with Acewood Petroleum Co. to become the present Richfield Oil Corp. of New York. He was made president of Richfield in 1935, which position he held until his recent retirement from that firm.

M. C. Gibler, former district sales manager of Gulf Oil Corp. in the Abilene, Tex., headquarters, has been named district sales manager of the Dallas district.

G. L. Browne, geologist, formerly with Carter Oil Co. at Carmi, Ill., has joined Inland Producers, Inc., at Mattoon, Ill., and **Halbert H. Bybee,** geologist for Carter, has resigned to join Continental Oil Co. at Fort Worth, Tex.

L. W. Elderkin, formerly assistant district superintendent of Shell Oil Co., Inc., at Great Bend, Kans., has been named district superintendent at McPherson, Kans., to succeed the late R. T. McNally.

Vitale Ricciardi, who earlier this year was named assistant manager of the marine operations division of The Texas Co., has been appointed manager to succeed the late A. S. Angus. **James V. C. Malcolmson** was named manager of the company's construction and repair division of the marine department.

Pliny del Valle, formerly superintendent at Houston, Tex., for Continental Oil Co., has been appointed assistant to **W. C. Stout,** assistant manager of the land department at Houston; **William G. Carlile,** former-

PERSONALS

ly assistant superintendent at Houston, has been named superintendent there; and **G. Denton Moore,** formerly land man at Houston, has been named assistant superintendent.

A. L. HENDERSON

A. L. Henderson has been named manager of Ohio Oil Co.'s newly created division to be located at Terre Haute, Ind. The company's production operations in four of its eastern divisions will be consolidated under the new division. The Terre Haute division will include the states of Michigan, Illinois, Indiana, Ohio, Kentucky, Tennessee, Pennsylvania, Virginia, and West Virginia. This region is presently divided into four production divisions with headquarters at Grand Rapids, Mich., Marshall, Ill., Findlay, Ohio, and Owensboro, Ky. Pipe line, refining, and marketing organizations of the company are not affected by the change. The company will maintain district offices in the Terre Haute division at Grand Rapids and Owensboro. Associated with Henderson in the new division offices will be: **I. G. Burrell,** division production superintendent; **W. E. Schoeneck,** division petroleum engineer; **R. E. Knipe,** division geologist; **E. J. Giffel,** division land man; **N. L. Battensclag,** division controller; **J. F. Diver,** division attorney; and **E. B. Peters,** supervisor of personnel. **J. D. Wheeler,** who has been division manager in Michigan for the past 2 years, has been reassigned to the newly created position of district manager of operations in West Texas and New Mexico in the Houston division. **R. L. Fillner,** former production superintendent at Findlay, has been appointed manager of the Grand Rapids district. **J. J. McClelland,** manager of the former Owensboro division, will remain in Owensboro as manager of operations in Kentucky, Tennessee, Ohio, Pennsylvania, Virginia, and West Virginia.

D. D. Standlee, Magnolia Pipe Line Co., Dallas, has been appointed assistant to the manager. He was formerly administrative assistant. **D. A. Murphy** and **G. F. O'Brien,** district superintendents, Magnolia Petroleum Co., producing division, have exchanged places. Murphy is now at Electra, Tex., and O'Brien is at Wewoka, Okla. **J. E. Stanley,** formerly assistant district superintendent at Alice, Tex., has been made superintendent of a newly created district, with headquarters at Falfurrias, Tex.

Robert B. Totten, geologist for Sun Oil Co., has been named in charge of the company's new office at Amarillo, Tex., to cover the Panhandle district.

Charles F. Smith, of the employe relations office in New York for Standard Oil Co. (N. J.), has been transferred to Aruba, where he will be responsible to management for all public and employe relations functions of local affiliated companies and will act in an advisory capacity to the marine manager. He has been with Standard Oil Co. (N. J.) since 1930.

E. A. Williford, formerly assistant division manager in the marketing department for Continental Oil Co., has been appointed manager of the company's Oklahoma-Arkansas marketing division. He succeeds the late W. F. Hird. Williford has been with Continental for 23 years.

R. L. JOHNSON

R. L. Johnson, superintendent of Sunray Oil Corp.'s Duncan refinery at Duncan, Okla., has been named manager of the refinery to succeed **Walter D. Manz,** who has resigned. Johnson has been associated with the Sunray organization since 1929 when Sunray bought the former Homaokla refinery at Allen, Okla., of which he was then superintendent. In 1946 he was transferred to Santa Maria, Calif., as superintendent of the company's newly acquired plant there. He was transferred to Duncan last year.

Robert H. Andrews, formerly manager of the organization and planning and procedure department of Marathon Corp., Menasha, Wis., has been appointed assistant to the president of Houdry Process Corp., Philadelphia, Pa. He will also serve as assistant secretary and assistant treasurer of the company. After graduating from Rice Institute, Andrews began his career with Humble Oil & Refining Co., Houston, Tex., where he coordinated the publishing of the company's production department operating manual.

Tom Lumpkin, resident counsel for Phillips Petroleum Co. in Venezuela and Colombia since 1946, has resigned to become manager of the public relations department of Mene Grande Oil Co. He has also been made one of the four members of the executive committee of the company. The change is effective October 1. Lumpkin joined Phillips' legal department at Amarillo, Tex., upon receiving his degree in law from the University of Texas. During the war he was with the FBI as assistant legal attache at Caracas. At the close of the war he was sent to Venezuela by Phillips and was recently made a secretary of the company in Venezuela.

H. W. ROSS

Harry W. Ross has been appointed executive assistant to **J. Frank Wilson,** vice president of Sohio Petroleum Co. and Standard Oil Co. (Ohio). He has opened offices for the company in the National Bank of Tulsa Building in Tulsa. Ross has had long experience as an independent producer and a production superintendent for The Texas Co. For the past several years he has been associated with Dowell Incorporated and Dow Chemical Co. His new work will have to do with crude-oil purchasing and pipe-line division activities.

John E. Weber has been named manager of the planning department of the engineering division of Catalytic Construction Co., a subsidiary of Houdry Process Corp. From 1943 to 1946 Weber served as division engineer with Kellex Corp., organizing and managing all phases of design and drafting on the atomic energy diffusion project at Oak Ridge, Tenn. The following year he served as oil refinery engineer for Arthur G. McKee Co. and in the year prior to joining Catalytic Construction Co., he was project engineer for Project Engineering Co. of New York.

Max A. Bornhauser, formerly district geologist for Continental Oil Co. at Lafayette, La., has been appointed division research geologist for the company at Houston, Tex. Bornhauser, a native of Weinfelden, Switzerland and holding a doctor's degree in geology, mineralogy and chemistry from the University of Bern, joined the company in 1934 at Houston. Prior to that time he has served as paleontologist, petrographer and geologist for other firms in Holland, California, and Texas.

H. A. Lennartz, district land man for Lion Oil Co. at Wichita, Kans.,

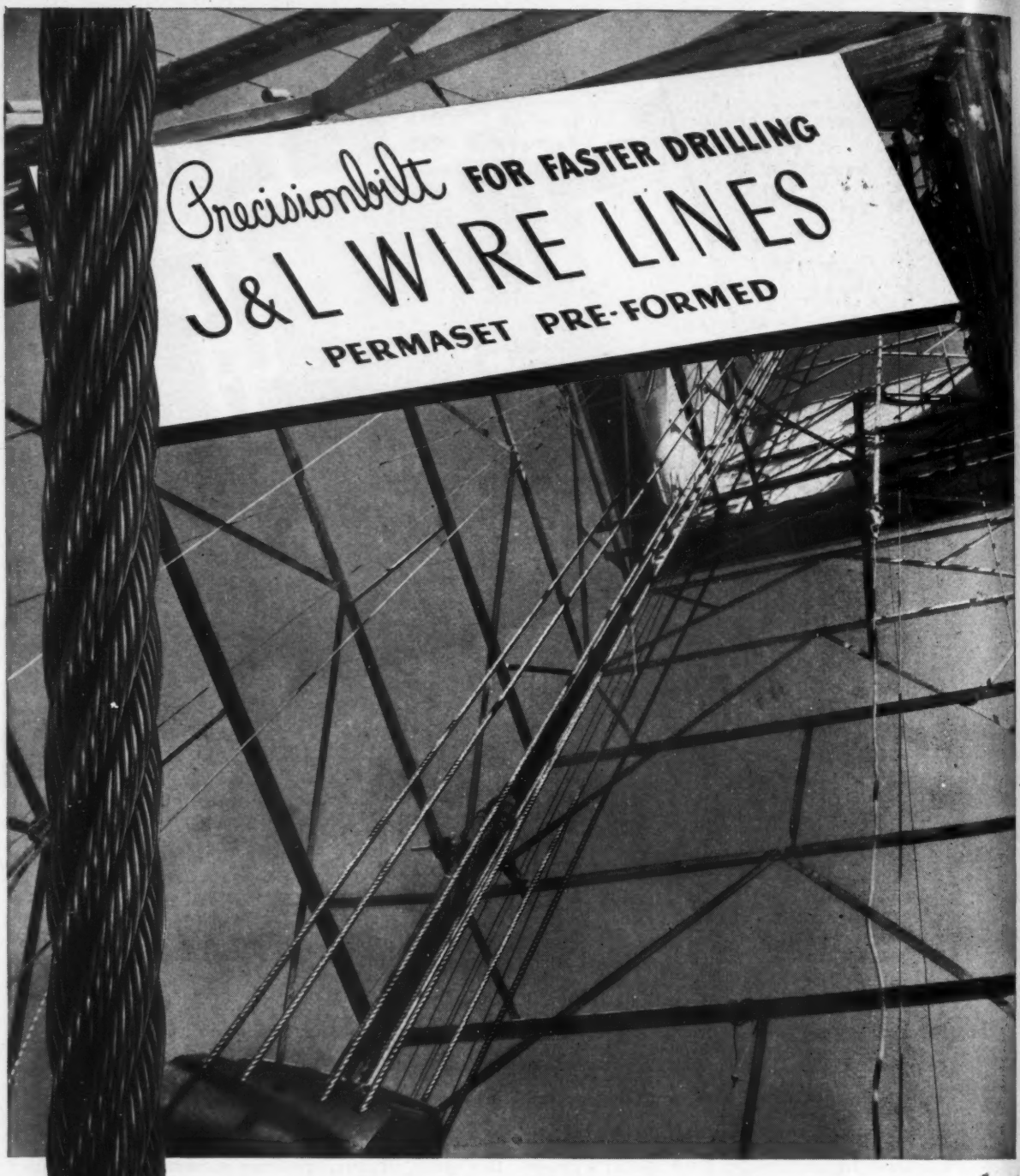
WICKES
PACKAGED-POWER
TYPE-A STEAM GENERATORS

Wickes Package Type-A Steam Generators are compactly designed for immediate installation with the *least possible installation problems* and disruption of production schedules. Designed to conserve headroom and floor space, Type-A Steam Generators are steel-encased package type units with casing, baffles, refractories, pressure parts, burners and floor all assembled. Engineered for pressures up to 850 psi, with sustained steam production of 20 to 275 nominal HP, producing up to 35,000 lbs. steam per hour, the Wickes Type-A Water Tube Steam Generator is a quick steamer, *requiring minimum maintenance and operating attention.* Consult Wickes first. We are completely equipped to design and build boilers to specific requirements.

RECOGNIZED QUALITY SINCE 1854

THE WICKES BOILER CO.
DIVISION OF THE WICKES CORPORATION
SAGINAW, MICHIGAN

SALES OFFICES: Atlanta, Boston, Charlotte, N. C., Chicago, Cincinnati, Denver, Detroit, Houston, Indianapolis, Kansas City, Los Angeles, Milwaukee, New York City, Pittsburgh, San Francisco, San Jose, Seattle, St. Louis, Tulsa, Mexico City, Buenos Aires.



J&L STEEL

Drilling crews know that they can depend on J&L *Precisionbilt* Wire Rope. They know that it is uniform in diameter, strength, durability and fatigue resistance. The extra life they get from J&L *Precisionbilt* Wire Rope speeds up drilling—lessens the time lost for line replacement. It's economical to specify "J&L *Precisionbilt*" when you buy drilling lines.

JONES & LAUGHLIN STEEL CORPORATION

PITTSBURGH 30, PENNSYLVANIA

J&L *Precisionbilt* PERMASET PRE-FORMED WIRE ROPE

416

has resigned to engage in independent activities in that area.

F. H. MEEDER

Frederick H. Meeder, manager of the traffic and product department for Richfield Oil Corp. of New York, has been named vice president of the company to succeed **Marc F. Braeckel,** who was recently elected president. Since the formation of the Richfield company in 1929 Meeder has held important positions in the construction and operation of Richfield terminals. Two other changes in executive personnel of the company include: **Howard G. Meyers,** formerly merchandising manager, has been appointed assistant to the president; and **Ralph Glock,** who has been district manager in several of the company's sales territories, has been named sales manager for Richfield.

Jack G. Coates, in the ad valorem tax department at Bartlesville, to the crude-oil purchasing and sales department as crude-oil representative in the West Texas and New Mexico area; **Gerald McGrew,** in charge of the company's training school for junior engineers, to buyer for the purchasing and stores department; and **John D. Forsyth,** who joined the company earlier this year, to succeed McGrew.

Ray Althouse, formerly office manager for the oil production division, Cities Service Oil Co., Bartlesville, Okla., has been promoted to executive assistant in the company's executive department. He has been succeeded by **M. R. Shaffer, Jr.,** who joined the company in 1939. Other recent Cities Service promotions include: **A. W. Page, Jr.,** who joined the company last year, to assistant to **Gerald R. Preston,** assistant treasurer of Cities Service and in charge of the acquisition of producing property; **Jack A. Cleverley,** assistant division superintendent of the oil production division at Oklahoma City, to assistant to **C. E. Beecher,** general superintendent at Bartlesville.

E. E. Ives, formerly assistant division superintendent for southern Oklahoma, Seminole, and northern Texas, to assistant division superintendent for the Oklahoma City and Seminole districts; **Glenn Harsh** of Oklahoma City, to assistant division superintendent for southern Oklahoma and northern Texas districts; **Robert C. Cooper,** formerly acting superintendent for western Kansas, to assistant division superintendent in charge of that area.

E. W. Mitchell, scout for Phillips Petroleum Co. at Jackson, Miss., has been transferred to Salt Lake City, Utah.

Floyd L. Karsten, Morris Rauch, Louis Pulaski, and **Harry Pulaski,** all of Houston, Tex., have sold their Oklahoma properties to Shell Oil Co., Inc. The wells are located in the Stephens County sector of Scholem-Alechem field.

SHIFTS—

Bernard J. Perry, engineer, Shell Oil Co., Inc., Long Beach, Calif., to Casper, Wyo.; **Lewis B. Moon,** superintendent, Sinclair Refining Co., Bryan, Tex., to Independence, Mo.; **R. N. Bills,** geologist, Amerada Petroleum Corp., Cleveland to Victoria, Tex.; **A. W. Pattillo,** engineer, Shell Pipe Line Corp., Goodrich to Douglass, Tex.; **C. W. Gore,** superintendent, Markhan Drilling Co., Cisco to Albany, Tex.

N. N. Jones, superintendent, Humble Oil & Refining Co., Gladewater to Florey, Tex.; **D. T. McCreary,** foreman, The Texas Co., Hebbronville to Eastland, Tex.; **Charles J. Delancey,** geologist, Humble Oil & Refining Co., Houston, Tex., to Los Angeles, Calif.; **R. M. Holland,** geologist, Sinclair Prairie Oil Co., Houston, to Gainesville, Tex.; **A. C. Christenson,** superintendent, Stanolind Oil & Gas Co., Mexia, Tex., to Crestview, Fla.

Harry H. Halsell, engineer, The Texas Co., Odessa to Goldsmith, Tex.; **Leo A. Herning,** engineer, Universal Oil Products Co., Texas City, Tex., to Robinson, Ill.; **H. L. Floeter,** foreman, American Republics Corp., Dequincy, La., to Silsbee, Tex.; **O. I. Jantz,** foreman, Amerada Petroleum Corp., Crowley, La., to Angleton, Tex.; **James W. Hunter,** geologist, Esso Standard Oil Co., Shreveport, La., to Houston, Tex.

James H. Hempen, engineer, J. P. Miller Co., Brookfield, Ill., to Evansville, Ill.; **Mixson Kincannon,** foreman, Wood River Oil & Refining Co., Alton, Ill., to Abilene, Tex.; **J. M. Garlick,** engineer, Shell Oil Co., Inc., Bethany to Tulsa; **E. E. Clark,** engineer, Phillips Petroleum Co., Kaw, Okla., to Cut Bank, Mont.; **R. H. Dobson,** chemist, Douglas Oil Co. of California, Clearwater to Bellflower, Calif.

H. K. Herr, foreman, Kerr-McGee Oil Industries, Inc., Sweetwater to Abilene, Tex.; **Don Johnston,** foreman, Kingwood Oil Co., Mt. Vernon, Ill., to Oklahoma City; **Irvin B. Murray,** geologist, California Co., Forest, Miss., to El Dorado, Ark.; **Bert Aiguier,** foreman, Danciger Oil & Refining Co., Natchez, Miss., to Columbia, La.; **C. M. Ross,** geologist, Amerada Petroleum Co., Ardmore to El Reno, Okla.; **A. E. Foster,** foreman, Sinclair Refining Co., Bristow to Davenport, Okla.

Rudolph W. Edmund, geologist, Globe Oil & Refining Co., Oklahoma City to Rock Island, Ill.; **Robert L. Hoss,** engineer, Phillips Petroleum Co., Tulsa, to Tyler, Tex.; **O. F. Schwanke,** foreman, Mid-Continent Petroleum Corp., Carthage to Wichita Falls, Tex.; **V. A. Walston,** engineer, Humble Oil & Refining Co., Midland to Houston, Tex.

Straub Roberts, foreman, Danciger Oil & Refining Co., Ferriday to Opelousas, La.; **J. W. Williams,** foreman, Falcon Seaboard Drilling Co., Thibodaux to Franklin, La.; **Rolla B. Trask,** foreman, Stanolind Oil & Gas Co., Trinidad to Rangely, Colo.; **Eugene F. Lewis,** engineer, Phillips Petroleum Co., Kaw to Shidler, Okla.; **Carl W. Blakey,** geologist, Seismograph Service Co., Tulsa, to Denver, Colo.

DEATHS

J. W. Fincher, vice president of Houston National Bank and one of the organizers of Humble Oil & Refining Co., died August 29 in Houston. He was the first treasurer of the Humble concern and became connected with the Houston National Bank in 1925.

Luther E. Lackey, 60, retired assistant pipe-line foreman for Lone Star Gas Co., died August 18 in Bowie, Tex.

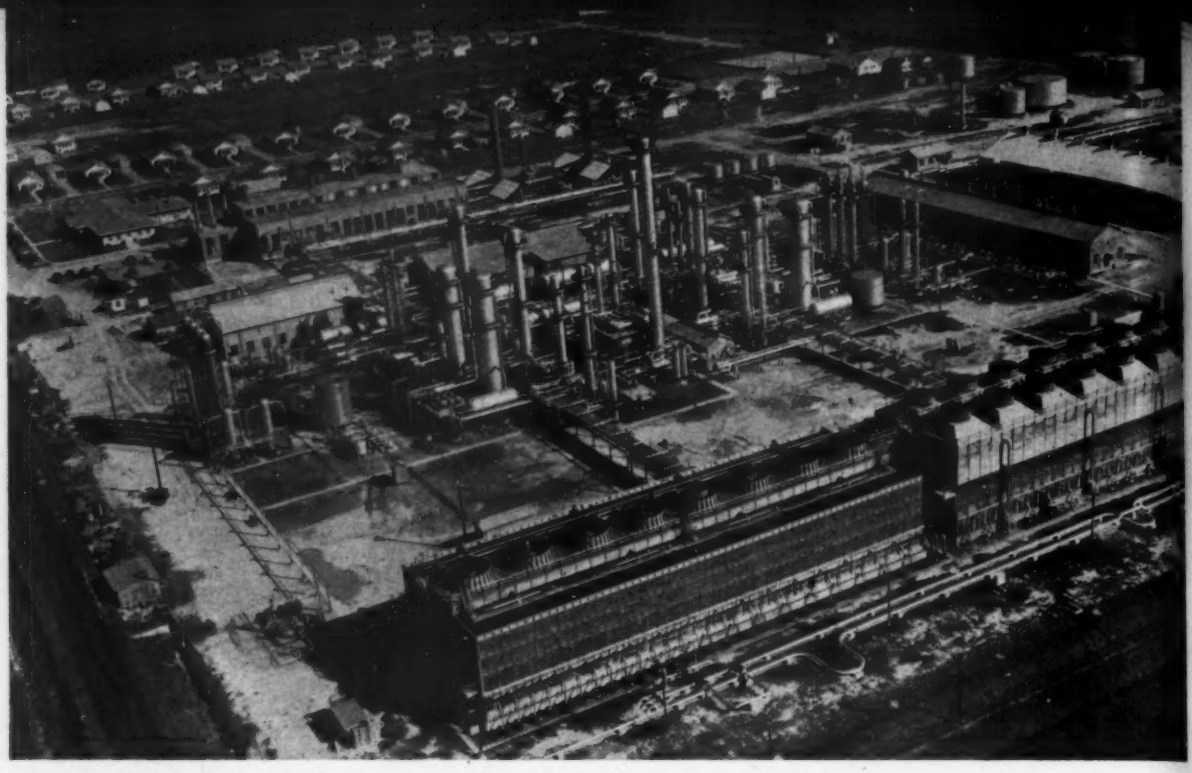
George J. Mandle, 82, early-day oil producer in the Pennsylvania area, died August 29 in Oil City, Pa.

Elmer James McJunkin, 86, early-day independent oil operator and producer and codiscoverer of the Pumpkin Center pool, north of Sapulpa, Okla., died September 6 in Tulsa.

Ralph L. North, 54, independent oil operator, died September 6 in Tulsa.

Harry B. Fletcher, 50, lubrication engineer for Sinclair Refining Co. of New York, died August 28 in Plainfield, N. J.

John Roy Lowe, driller, died recently in Amarillo, Tex.



Of true "Texas" size is this huge plant—process capacity: 458,000,000 cu. ft. per day. After extraction of L.P.G. and natural-gasoline fractions, 388,000,000 cu. ft. per day is recompressed to 3,100 psi. for injection back to producing formations

KATY GAS-CYCLING PLANT

. . . Largest of Its Type in Operation

by W. T. Robertson* and H. M. Stamper†

THE Katy gas-cycling plant is one of the largest of its type in operation. It is designed to process 458,000,000 cu. ft. of gas per day from 33 producing wells, recovering 80 per cent of the potential butanes and practically all of the pentane and heavier hydrocarbons. Approximately 400 million cubic feet of wet gas per day enter the high-pressure absorbers, operating at 1,800 psi. The absorber residue gas, around 388 million cubic feet per day, is returned by gas-engine compressor units to the 13 injection wells. The remaining plant capacity is utilized in the processing of gas for delivery to two sales transmission systems.

Extraction and fractionating facilities are installed to permit optimum recovery of the desired hydrocarbon fractions and segregation into various products for marketing. Under normal operations, the plant processes an average of 458 M.M.c.f. of reservoir gas per day from which the following products are recovered: methane-ethane-propane mixture, commercial propane, commercial isobutane, commercial normal butane, gasoline (72 octane to 91-octane aviation fuel), and heavy naphtha.

*Design engineer, and †assistant chief engineer, Humble Oil & Refining Co., Houston. Paper presented at fall meeting of petroleum division, American Society of Mechanical Engineers, September 7-9, Portland, Ore.

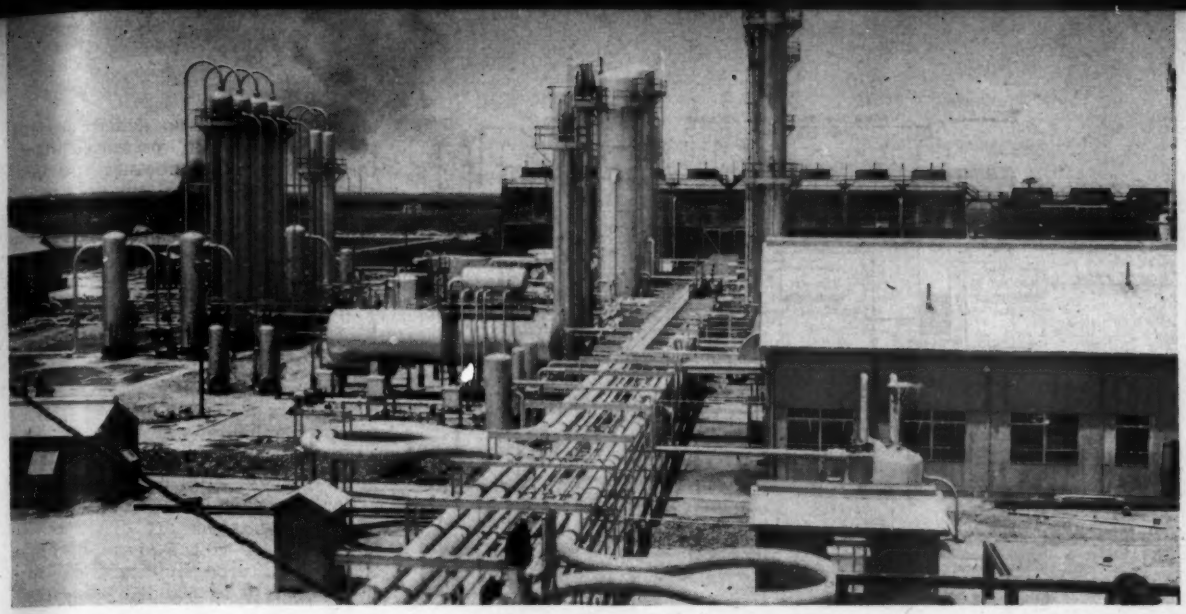
Field System

The gathering system is designed to take the gas from 33 producing wells, 3 of which are dual completions. The lines are sized for a maximum daily production of 20 million cubic feet from the edge wells and 25 million cubic feet from the other completions. The gathering system is designed for a working pressure of 2,700 psi. at 130° F. Each producing well is equipped with a meter setting for metering the gas produced from each sand.

The injection field line system is designed so that approximately 50 million cubic feet can be delivered to each injection well with a maximum pressure drop of 100 lb. between the compressors and the injection well heads. Of this pressure drop, about 25 lb. is due to line losses at plant, expansion bends, meter settings, and well-head connections. All piping is constructed in accordance with A.S.A. Code for High Pressure Piping. The field lines are securely anchored at each end and between each expansion bend provided in the line. Expansion bends are also installed at the well heads to provide for expansion in the well casing. The injection system is designed for a working pressure of 3,500 psi. at 175° F.

High Pressure Gas System Within Plant

The producing wells, at an average flow rate of 25 million cubic feet per day each, have a pressure at the well head of approximately 2,450 psi., and a flowing temperature of 165° F. The wet gas arrives at the plant at a pressure of 2,200 psi. and a temperature around 130° F. The gas to be processed in the high-pressure absorbers and handled through the compressor unit for reinjection to the producing formation is first cooled in the high-pressure cooling coils located in the cooling tower. Such cooling reduces the gas temperature



Distillation area showing sales gas separators, sales gas absorbers, high-pressure absorbers, No. 1 and No. 2 still and high-pressure, intermediate, and low-pressure reabsorbers

from 130° to 90° F., at inlet plant pressure.

After cooling, the gas is delivered to the 1,800-lb. system through two headers and pressure-reducing regulators which control the absorber and compressor suction pressure at 1,800 psi. Before introducing the gas into the four 1,800-lb. absorbers, it is passed through two separators in parallel to remove the liquid formed by previous cooling and pressure reduction. The discussion of the liquid flow will follow under 'Condensate and Process System."

Gas from the separators operating at 1,800 psi. is next delivered and equally distributed to absorbers operating in parallel. Sufficient absorption oil contacts the gas for the extraction at this point of approximately 80 per cent of the butanes. The residue gas is then passed through two scrubbers in parallel operation where any large quantity of liquid that might be carried overhead from the absorbers, due to mechanical upset, will be automatically collected and drained. The gas then goes into the compressors for delivery to the injection wells. All gas volumes referred to in this discussion are at a base pressure of 14.7 psia. and 60° F. temperature.

The compressor unit has 12,600 compressor horsepower. The compressors are installed to deliver 388 million cubic feet per day of high-pressure absorber residue gas to the injection system and wells at a suction pressure of 1,800 psi. and a discharge pressure of 3,000 psi. A closed jacket cooling water system is provided for the unit, the makeup water being condensed steam from the power plant. Electric-motor-driven centrifugal pumps circulate the required amount of jacket cooling water.

Condensate System

A separate system is provided for processing the liquid formed by condensation and separated from the gas in the 1,800 and 800 lb. sales gas separators.

The liquid separated in the 1,800-lb. gas separators is flashed into the sales gas separator, operating at 800 psi. This permits reabsorption of the flashed gases at optimum pressure and reduces the quantity of field wet gas required to supply the sales gas demand. The 800-lb. separator liquid is further flashed in stages to 600, 200, and 35 psi., the flashed gases going to the reabsorbers at these respective pressures. In this manner, all of the flashed vapors are processed in the reabsorption system for the retention of the desired butanes.

The liquid from the low-pressure condensate flash tank is delivered by pump through heat exchangers, a preheater, and into the condensate still operating at 45 psi. Sufficient stripping steam is introduced into the base of the still to effect the removal of all the 250° F. end-point and lighter hydrocarbon fractions, the overhead vapors passing through a condenser where approximately 90 per cent condensation is obtained. The product from the base of the condensate still is heat exchanged against the feed material and then delivered to storage as gasoline free distillate.

Distillation System

The primary purpose of the distillation system is to process the rich oil from the absorption unit, remove the desired gasoline fractions, and provide a well stripped heavy absorption oil for recirculation to the absorption system. To accomplish this, it is necessary to operate a two-still system.

The No. 1 still operating at 90 psi. is designed to remove the 250° F.

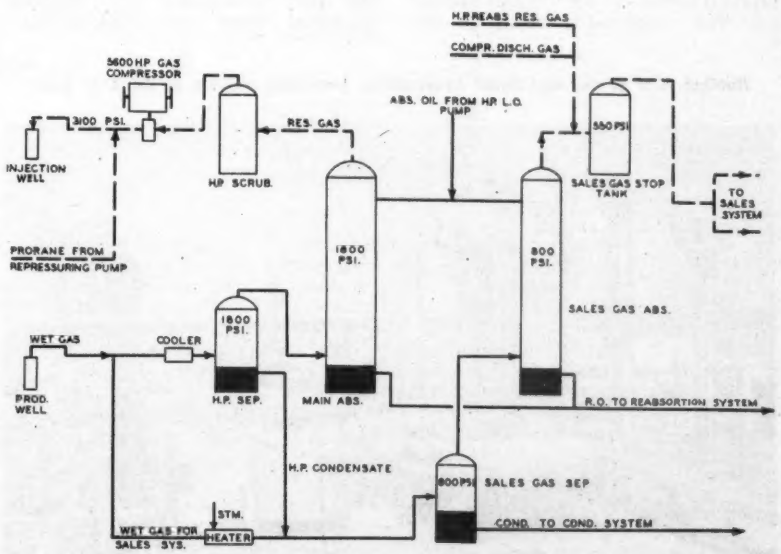


Fig. 1—High-pressure gas and sales gas systems at Katy

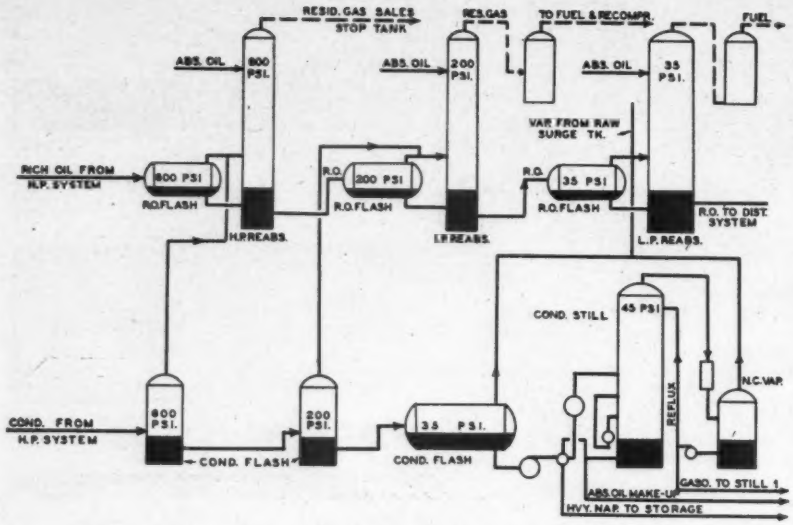


Fig. 2—Reabsorption and condensate systems for Katy plant

end-point gasoline product from the rich oil. This is accomplished by pumping the rich oil from the absorption system through heat exchangers and direct-fired heaters to bring the temperature level to 530° F. Sufficient stripping steam effects the removal of the desired overhead fractions while a hot reflux controls the gasoline final boiling point. The liquid condensed from the overhead of this still provides the raw charge to the stabilizers.

The oil leaving the base of the No. 1 still contains hydrocarbons boiling between 250° and 500° F. The No. 2 still, operating at 5 psi., receives the oil feed for further processing at approximately 500° F. Sufficient stripping steam removes the heavy hydrocarbons and gives control on the initial boiling point of the absorption oil from the bottom of the still. The stripped absorption oil is next pumped through the heat exchangers and final oil coolers to the various absorbers. The overhead product is condensed and delivered to storage with the bottoms from the condensate still.

The absorption oil for the sales gas absorbers and the high-pressure reabsorbers is withdrawn as a side stream from the main high-pressure lean-oil pump. This pump, for delivering the oil to these absorbers, is a steam turbine driven centrifugal unit.

Steam and Power System

Steam. — The steam and electric system for the Katy gas-cycling plant is unusual compared with most plants of this nature. In the plant design, it was decided to use steam and electrically driven centrifugal pumps where practical. The plant process requires approximately 235,000 lb. of steam per hour at 250, 105, and 15 psi. pressure and an electric power and lighting load of 2,500 kw.

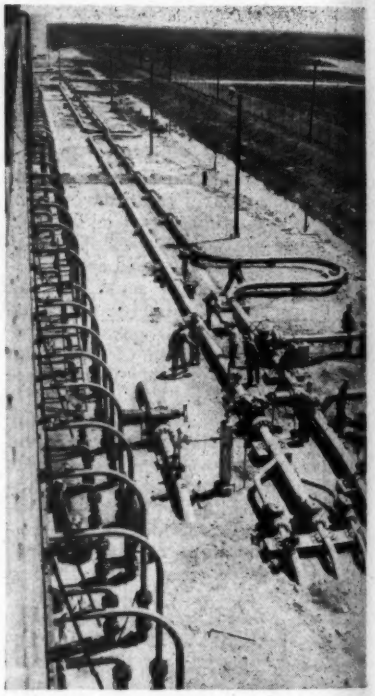
After analyzing the various power schemes, the most attractive was the generation of steam at a pressure of 600 psi., generating the required electrical load by back-pressure steam-turbine driven generators and staging the steam pressures down through the plant so that the total steam required for the generator drives balanced the requirements for process heating, stripping, and pump drives.

To meet the processing requirements of steam, four 700-lb. working pressure B & W boilers are installed. Each boiler is designed to produce 70,000 lb. per hour steam at 600 lb. pressure and 675° F. temperature. The boilers are of the integral furnace type, completely water walled and equipped with forced and induced draft fans with stub stacks.

For the calculated electrical load of 2,500 kw., there are installed two 2,000-kw., 440-volt, 3-phase, 60-cycle, 3,600-r.p.m. turbogenerators. The turbines operate at 600 lb. inlet steam pressure and throttle to 250 per cent back pressure.

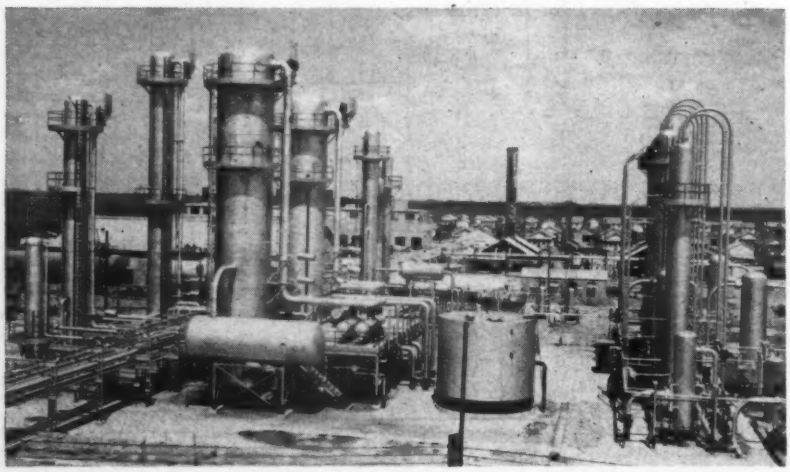
Steam from the 600-lb. header is used to drive the generator and boiler feed pumps and turbines, the exhaust pressure from these turbines being maintained at 250 psi. The exhaust steam at 250 psi. is next utilized in the distillation unit process for heating, stripping, and pump drives. The steam as utilized in these services is all condensed and returned to the deaerating heater for feed to the boilers.

There are three dual-drive centrifugal feed-water pumps operating at 3,550 r.p.m. each, driven through a flexible coupling by a 150-hp. motor at one end and by a steam turbine at the other end. An automatic regu-



Long group of outgoing gas-injection lines carrying high-pressure gas

Another view of gas and liquid hydrocarbon processing vessels at the Katy plant



lating valve in the steam line to the three turbines divides the power input to the pumps between the turbines and motors for the purpose of controlling the steam pressure in the 250-lb. exhaust header. Complete automatic combustion control equipment is installed on each boiler for maintaining pressure, forced draft, furnace draft, and induced draft.

The distribution and utilization of steam from the boiler house at a pressure of 250 psi. is a most interesting feature. This is shown on power plant flow sheet, Fig. 4. The turbines driving the fat oil pumps and depropanizer charge pump are of the back-pressure type, exhausting into the 105-lb. steam header. The steam from the makeup evaporator also goes into this header. The 105-lb. steam is next used in stripping as illustrated. The quantity of stripping steam required at 15 psi. is 12,700 lb. per hour. To provide this steam, the turbines driving the hot-lean-oil pump and recompressor, exhaust into a steam header operating at 15 psi. The pressure in the 15-lb. steam header is controlled by means of pressure-reducing regulator from the 105-lb. system. Sufficient regulating and relief valve equipment is installed to prevent excessive pressure in any of the steam headers during either partial or full load operations.

Two centrifugal oil pumps delivering absorption oil to the high-pressure absorbers are driven by a 2,000-hp. steam turbine operating at 3,600 r.p.m. The inlet steam is at a pressure of 250 psi. while the turbine exhaust steam is piped into a 2,800-sq. ft. surface condenser operating under 4 in. of mercury back pressure. The exhaust steam from turbine driving the liquid repressuring pump along with excess steam from the 15-lb. steam header is also introduced into this surface condenser. The condensate from the condenser is returned by pump to the deaerating heater in the power plant.

The condensed steam from the various units of distillation equipment is returned to a steam condensate filter and separator system where any trace of oil or contamination is removed and the condensate returned by centrifugal pump to the deaerating heater in the power plant.

This method of operation assures practically total return of condensed steam for feed to the boilers.

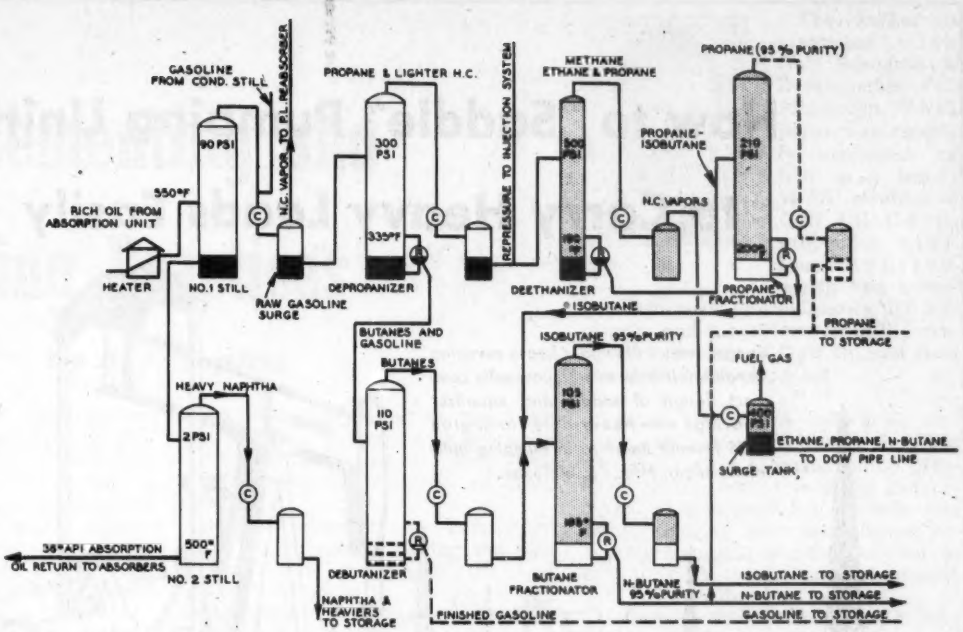
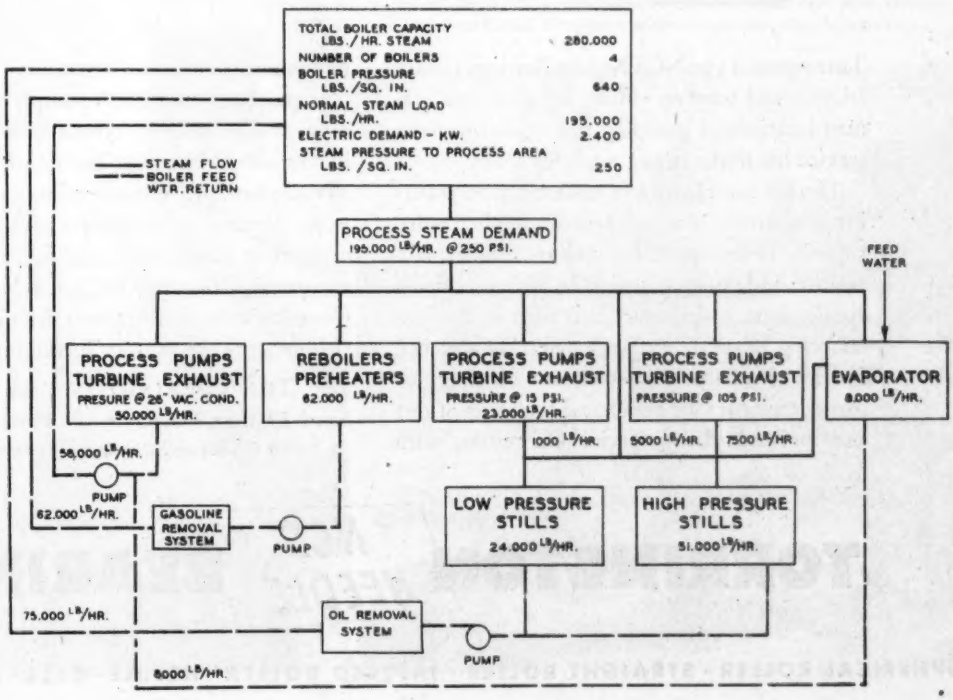


Fig. 3—Distillation and fractionating units, Katy plant

Acknowledgment

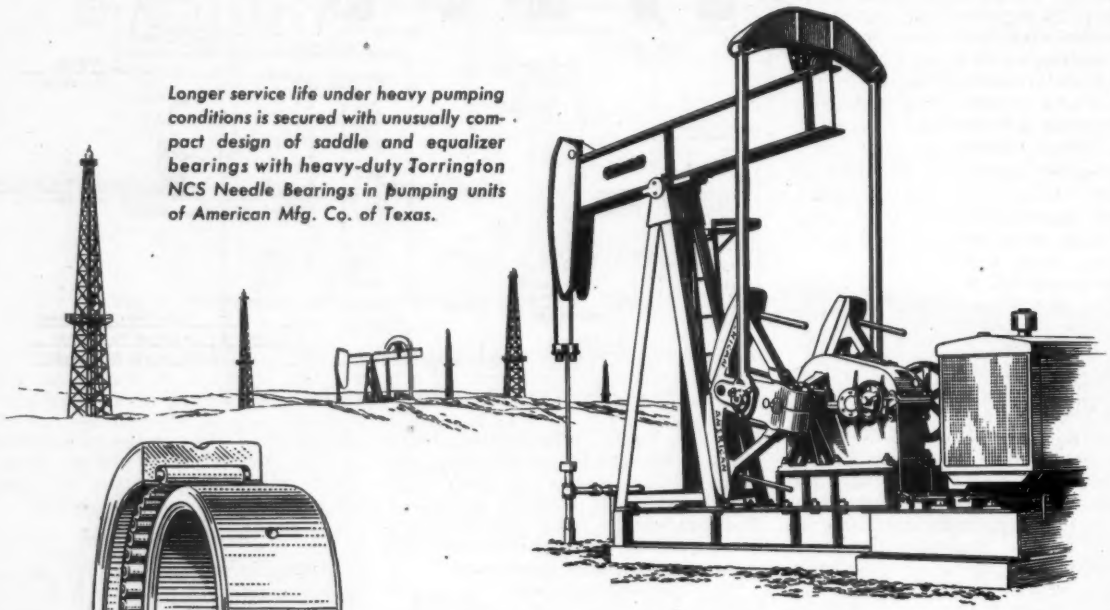
Appreciation is extended to the gas division of Humble Oil & Refining Co. and especially to Frank G. Noble, assistant superintendent of the gas division, who gave valuable assistance in securing data, and to the management of the company for permission to prepare and present this paper.

Fig. 4—Power-plant flow diagram and data


TOTAL BOILER CAPACITY LBS / HR. STEAM 280.000
NUMBER OF BOILERS 4
BOILER PRESSURE LBS. /SQ. IN. 640
NORMAL STEAM LOAD LBS./HR. 195.000
ELECTRIC DEMAND - KW. 2.400
STEAM PRESSURE TO PROCESS AREA LBS. /SQ. IN. 250
STEAM FLOW
BOILER FEED WTR. RETURN
PROCESS STEAM DEMAND 195.000 LB/HR. @ 250 PSI.
FEED WATER
PROCESS PUMPS TURBINE EXHAUST PRESURE @ 26" VAC. COND. 50.000 LB/HR.
REBOILERS PREHEATERS 62.000 LB/HR.
PROCESS PUMPS TURBINE EXHAUST PRESSURE @ 15 PSI. 23.000 LB/HR.
PROCESS PUMPS TURBINE EXHAUST PRESSURE @ 105 PSI.
EVAPORATOR 8.000 LB/HR.
1000 LB/HR.
5000 LB/HR.
7500 LB/HR.
58.000 LB/HR.
PUMP
62.000 LB/HR.
GASOLINE REMOVAL SYSTEM
PUMP
LOW PRESSURE STILLS 24.000 LB/HR.
HIGH PRESSURE STILLS 51.000 LB/HR.
75.000 LB/HR.
OIL REMOVAL SYSTEM
PUMP
8000 LB/HR.

How to "Saddle" Pumping Units to Carry Heavy Loads Easily

Longer service life under heavy pumping conditions is secured with unusually compact design of saddle and equalizer bearings with heavy-duty Torrington NCS Needle Bearings in pumping units of American Mfg. Co. of Texas.



. . . in saddle and equalizer applications, Torrington NCS Needle Bearings carry heavier loads in less space a longer time.

Torrington Type NCS Needle Bearings reduce friction and wear in saddle, equalizer and pitman locations in pumping units, assuring long service life under heavy pumping loads.

The full complement of small diameter rollers in these sturdy bearings provides higher radial capacity in less space. Designs are simpler, fabrication and assembly easier. In these oscillating applications, rollers start and turn easily, distributing lubricant evenly to bearing surfaces. Precise clearances permit effective sealing, assuring efficient lubrication and exclusion of dirt and moisture. Long service life results, with minimum maintenance attention.

In pumping units, slush pumps, rotary tables, draw works, swivels, crown blocks, traveling blocks and drilling rigs, Torrington Bearings of all types have proved their ability to carry heavy loads. Torrington's engineers have had years of experience designing, building and applying anti-friction bearings for oil field equipment. Consult them on your next friction problem. Call or write the nearest Torrington office.

THE TORRINGTON COMPANY

South Bend 21, Ind. • *Torrington, Conn.*

District Offices and Distributors in Principal Cities

TORRINGTON NCS NEEDLE **BEARINGS**

SPHERICAL ROLLER · STRAIGHT ROLLER · TAPERED ROLLER · NEEDLE · BALL · NEEDLE ROLLERS

Review of

Casing Cementing and Perforating Practices

by A. J. Teplitz

The author is associated with Gulf Research & Development Co., Pittsburgh. This paper was recently presented by him at a supervisors' meeting of Gulf Oil Corp., production division, Houston, which had a representation of approximately 100 engineers and supervisors from the production division of Gulf Oil and Gulf Research & Development.

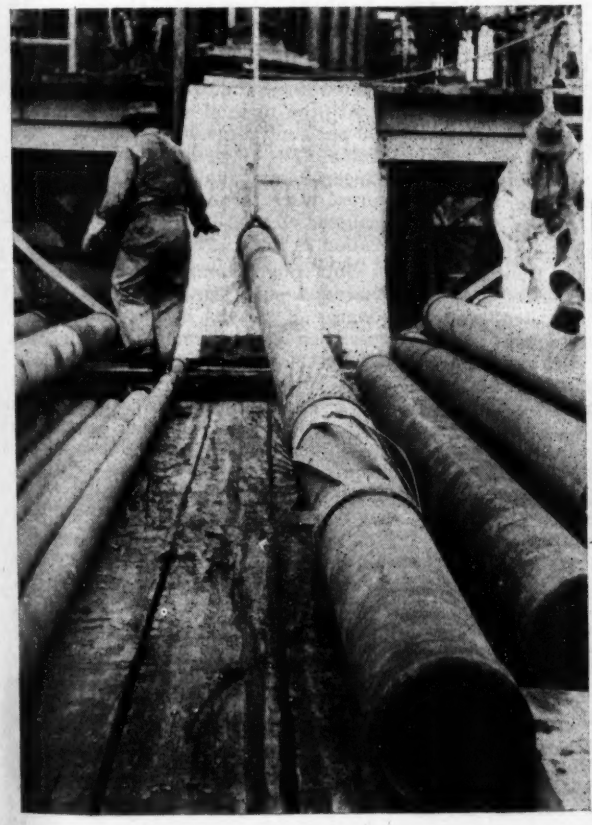
ABOUT 2 years have elapsed since the Gulf companies began to use scratchers and centralizers according to a pattern established during a study of cementing problems directed by the production research coordinating committee. Most of the preliminary work, as well as the first trials of the method, were conducted in the Gulf Coast area.

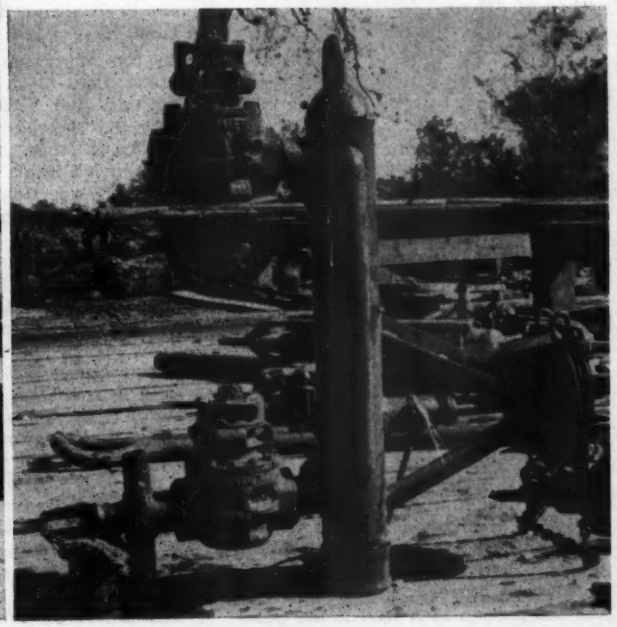
Since that time, the use of the technique has spread through many other districts of the Gulf company and its affiliates. To date this method of cementing casing has been employed in approximately 300 Gulf wells in the United States, Venezuela, and Kuwait.

Obviously it has not been possible for those who participated in the early development of the process to maintain intimate contact with all these jobs, but an effort has been made to keep in touch with the work on a broad scale and to follow some of the cementing practices of other companies.

A few improvements have been made in the process during the past 2 years. For example, in the first casing settings with scratchers and centralizers, cementing was started within a few minutes after the pipe had reached bottom, and circulation and reciprocation had begun. In one district it was decided to hold off cementing until returns were obtained from bottom, which required moving the pipe and circulating for an hour to an hour and a half, depending on the depth of the well and rate of pumping. The results were so satisfactory that this procedure was then widely adopted and had the effect of freeing the hole from cuttings and mud removed by the scratchers, thus reducing pump pressures which tended to cause lost returns. It also provided a safety factor in assuring there was nothing inside the casing to clog the float valves and prevent the passage of cement into the annulus.

Later in Venezuela when it was discovered that this procedure did not afford sufficient reduction in pump pressures due to the unusual mud conditions encountered, the method was further modified. In this modification, the operation of running the casing into the hole was stopped periodically, and that portion of the well penetrated by the pipe was circulated until the returns were clean. Thus, when the casing finally reached bottom, most of the hole had already





Left: Running a centralizer-scratcher equipped joint of 9⅝-in. casing at a well in San Joaquin field of Eastern Venezuela. Below: New cementing head developed for use with the centralizer-scratcher method of cementing. Mud pump is connected to upper fitting while from one to three cementing hoses can be connected to cross at bottom of head. This arrangement permits continued pipe reciprocation and mud circulation when cementing plug is released

been cleared of cuttings and gelled mud, and the remainder of the job could be carried out with fairly normal pump pressures. This is the procedure employed today, and has been found very effective, except in a few wells, in reducing loss of circulation.

During the introduction of the method in Venezuela, the manufacturer of the abrading and centralizing devices also developed a special cementing head, by means of which it was possible to release and pump down the cementing plug without interrupting pipe reciprocation or fluid circulation. This feature eliminated the prolonged delays which sometimes precede the step of pumping down the plug, with the attending danger of rendering the pipe immovable at a critical stage in the cementing job. About the same time and quite independently, a cementing head was developed which greatly reduced the time required for releasing the cementing plug.

These innovations served to remove some of the objections raised against the use of the scratcher method when it was first introduced. Despite these improvements, returns sometimes are still lost, even when setting casing through sand formations, and this loss is a source of worry to some operators. The fact that in most of these same wells, mud fluid disappears during drilling and other operations, however, does not seem to cause similar anxiety.

Observations were made in a number of these wells during the cement job, and no indication was found that the mud or cement entered the pay zone or that the producing section had been damaged in any way. It was also observed that even though fluid was being lost somewhere in the well, there was no difficulty in keeping the hole full; nor was there any evidence of danger of a blowout.

Limestone Well Problems

In cementing casing in limestone wells, the loss of circulation is more prevalent, and here again the phenomenon occurs whether scratchers are used or not. Also in such cases cement has been found to enter the pay section, and it appears likely the recovery of oil from these wells may be affected. At present the research department is working on the development of a low-density cement to lower the hydrostatic head of the cement column and thus reduce the loss. An alternative method of combating this condition has been suggested by one of the scratcher manufacturers. He proposes sealing off the porous sections with small amounts of cement, by a specially developed technique, before setting casing. The method appears to hold some promise and probably should be given a field trial.

Another source of anxiety during the completion of a well is the possibility of sticking the casing. In general it has been observed that casing properly equipped with scratchers and centralizers runs into the hole with greater ease than bare casing. Occasionally, in the application of the scratcher - centralizer method, it is noted that toward the end of the operation, when most of the cement slurry has rounded the casing shoe and the plug is nearing bottom, the reciprocation of the pipe becomes somewhat sluggish as shown by the weight indicator. Under such conditions it becomes advisable to stop the movement of the casing rather than run the risk of overloading the equipment.

Such behavior should not rightfully be called "sticking," since at this stage the casing has already been reciprocated over a prolonged period, and the main purpose of the job has already been accomplished. Furthermore, the amplitude of the reciprocation has been confined to such a length that the casing shoe is always below the producing zone, and stopping the pipe anywhere within that length is of no particular consequence to the final completion of the well.

The really troublesome consequences result from sticking the pipe while it is being run to bottom. This happens occasionally in running ordinary casing, but if it occurs when the latter is equipped with scratchers and centralizers there is a tendency to blame these devices. Actually the reverse is true; the more scratchers and centralizers, particularly the latter, there are on the pipe, the less the chance of sticking it. As evidence, consider the fact that most long strings of casing, after being run to bottom, become immovable as soon as mud circulation is begun, whereas under similar conditions casings equipped with centralizing devices have been reciprocated for hours at a time.

In the many casing settings with these devices in Gulf's Houston division, only two experiences of stuck casing have been reported, and in both cases the subsequent fishing jobs showed that sticking occurred above the section equipped with scratchers and centralizers. In one instance where it was necessary to interrupt reciprocation for a prolonged period, always a risky practice, the casing was found to be stuck when operations were resumed. After cutting out the pipe to a point above the scratchers, the remainder of the casing was fished out in one trip, proving that the stuck portion was above the section equipped with scratchers. In the other case, when the pipe was cut down to a point several hundred feet above the scratchers, the casing which was left was so free that it dropped down the hole of its own weight, and was easily recovered.

Indicative of the success of the scratcher-centralizer cementing method is the remarkable increase in the use of such equipment by the industry in the past 2 years, and the several variations of these devices which have suddenly appeared upon the market. A number of new centralizers have been manufactured and are finding considerable usage in well completions.

Paloma Field Experience

A report has been made by an operator on his completions in Paloma field. The report covers a number of wells completed before and after January 1947. Prior to that date a few scratchers and centralizers were being used on casing jobs, but not in the manner developed in the Gulf Coast. Enumeration of the results obtained should be prefaced by the information that Paloma field regulations require operators to perforate and test the casing at various points to make certain the producing zones are properly isolated. In 30 wells drilled before January 1947, 25 failures were discovered during this testing process. Since that time, 28 wells have been completed in the approved manner with only a single failure of shutoff.

Records were received recently of the operation of the process during the first 6 months following its introduction into Eastern Venezuela, where casing cementations had previously been unusually troublesome. During this initiative period, the scratcher - centralizer - reciprocation procedure was employed in 65 wells, most of them dual or triple-zone completions, with a total of 230 intervals tested for production. It was stated that "the method was approximately 90 per cent successful in allowing the completion of wells as clean oil producers," and that some of the failures were probably due to other causes, such as inaccuracies of perforation or inferior-grade cement.

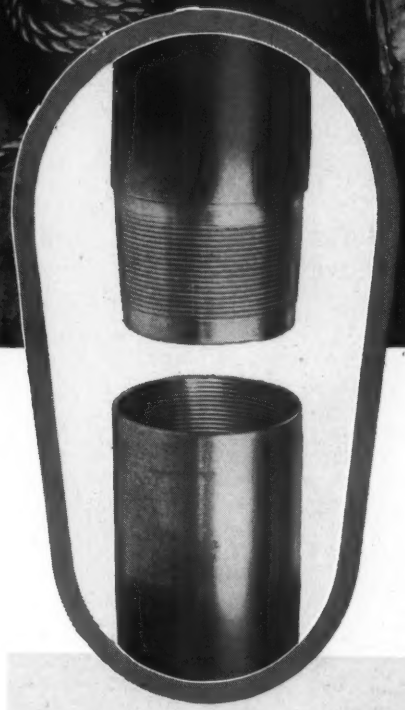
Subsequent completions, it was believed, would show an even greater degree of success because of the experience gained and the application of closer supervision to the operation. The communication stated further: "The greatly improved cementations afforded by the scratcher-centralizer technique have completely revolutionized oil-well cementing operations in Eastern Venezuela, and since completion of the first few jobs by this method, it has been completely accepted by all operating personnel and is now standard procedure for all cementations—surface, intermediate, and oil strings."

Problem Created by Scratchers

Although little doubt now remains that successful well cementing requires the use of abrading devices, it must be admitted this practice has created another problem, which in

(Continued on page 89)

SPANG EXTREME LINE CASING *has* HIGH JOINT STRENGTH



● Satisfied users everywhere will tell you that Spang Extreme Line Casing Joints are ruggedly constructed to resist the terrific punishment encountered in deep wells. This unusual strength results from improved design that includes specially modified Acme threads with steep flank angles to guarantee a tight, efficient interlock.

But, this is only one of many outstanding advantages found in Spang Extreme Line Casing. Spang Extreme Line can be run faster than any other type. It provides positive resistance to leakage. And the streamlined joint permits use of a larger final casing size and reduces friction in running in and out of hole.

Because of these valuable features you'll find Spang Extreme Line Casing used in many of the world's deepest fields. Specify Spang and you'll benefit from the multiple advantages of increased speed, rugged dependability and longer casing life. Write us for complete details or contact your nearby National Supply Store for expert help and immediate service on all your casing problems.

SPANG EXTREME LINE CASING
has 8 distinctive advantages

1. High Joint Strength.
2. Positive Resistance to Leakage.
3. Minimum Outside Diameter at Joint.
4. Maximum Speed in Running.
5. Streamlined Exterior Contour.
6. High Resistance to Damage.
7. *Internal Flush Joint.
8. 50% less threaded connections than A. P. I. Casing.

*All but lighest weights of a size will pass the A. P. I. drift.

SPANG-CHALFANT

DIVISION OF THE NATIONAL SUPPLY COMPANY
GENERAL SALES OFFICE: PITTSBURGH, PA.

DISTRICT SALES OFFICES: ATLANTA; BOSTON; CHICAGO; DENVER; DETROIT; HOUSTON; LOS ANGELES; NEW YORK; PHILADELPHIA; PITTSBURGH; ST. LOUIS; SAN FRANCISCO; TULSA

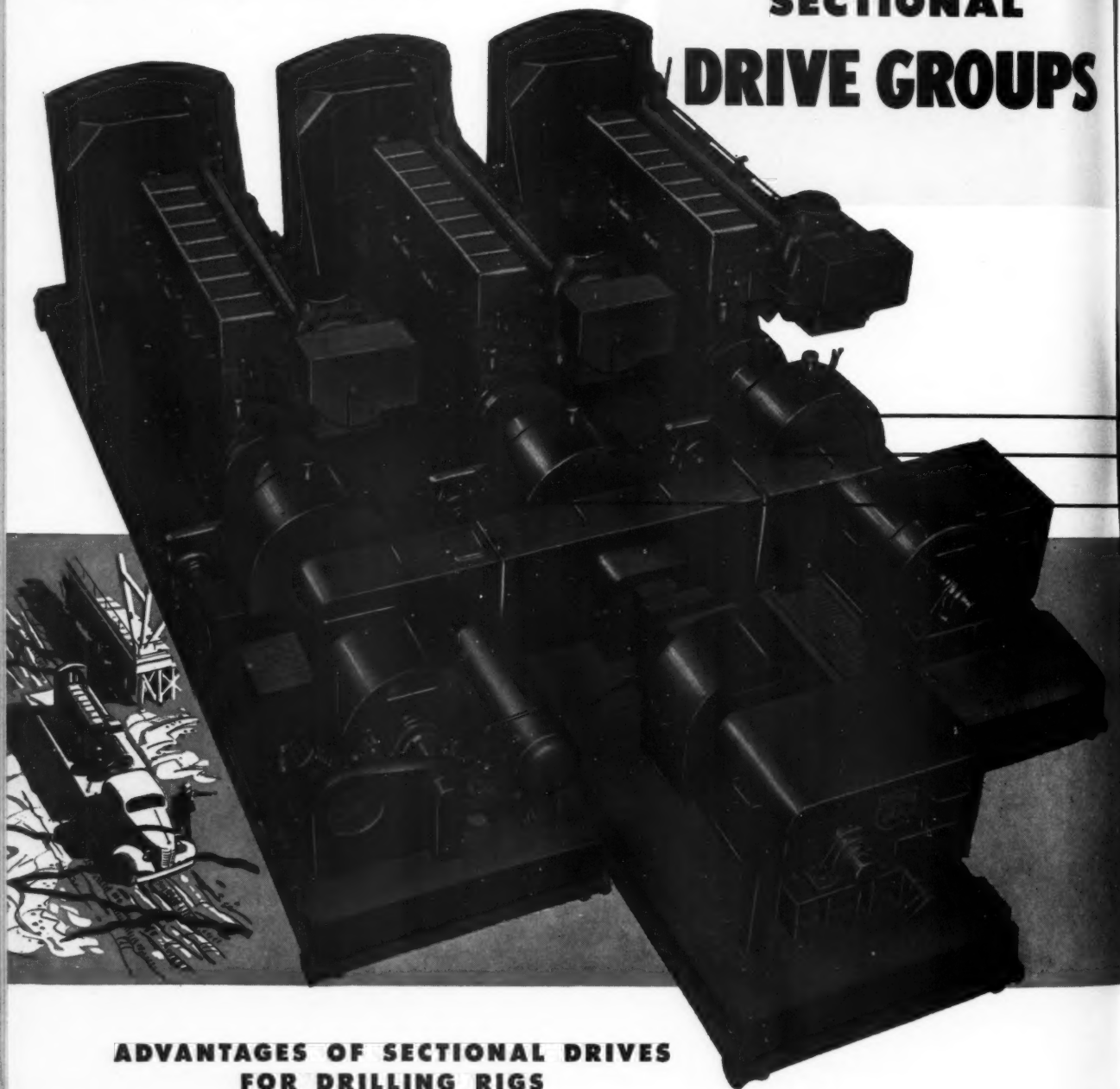
★ THE INDUSTRY'S MOST COMPLETE LINE OF OIL FIELD EQUIPMENT ★

★ TWO GREAT ADVANCES IN DR

introduced by

National in IDEAL SECTIONAL DRIVE GROUPS

wit



ADVANTAGES OF SECTIONAL DRIVES FOR DRILLING RIGS

1. Each power unit (Engine and Coupling) is an individually mounted self contained unit.
2. Power units may be added to or taken from the Consolidated Rig at the operator's desire.
3. Transportation is facilitated by the characteristic unit feature.
4. Many difficult alignment problems are eliminated from rigging up procedure in the field.
5. Unitizing the engine and fluid drive coupling saves valuable space at the rig site.
6. Factory alignment assures longer life and higher efficiency in operating; thereby a cost cutting feature.

TE
GENER
DIVISIO
EXPORT
NEW YO

FOR DRILLING ★ *THE INDUSTRY'S MOST COMPLETE* INE

DRILLING RIG DESIGN ★

with

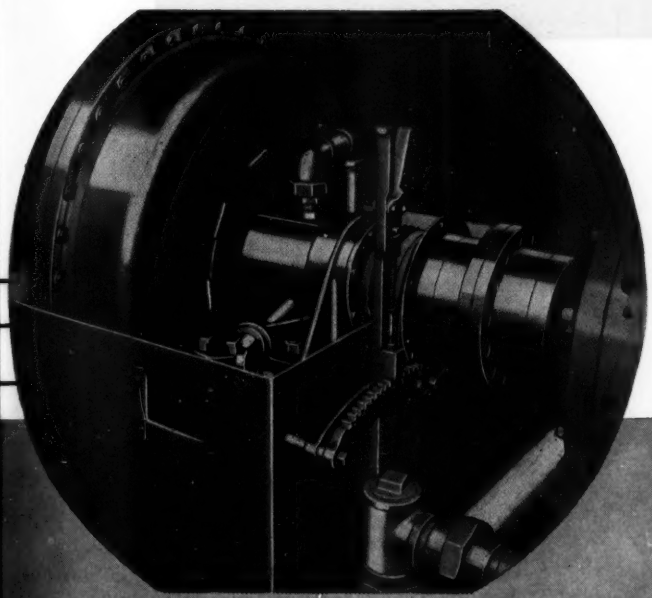
IDEAL

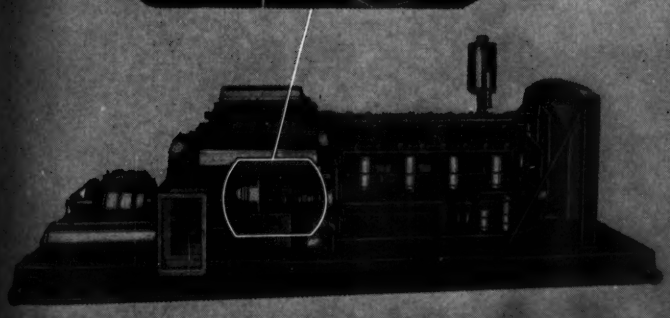
GÝROL

REG. U.S. PAT. OFF.

FLUID DRIVE

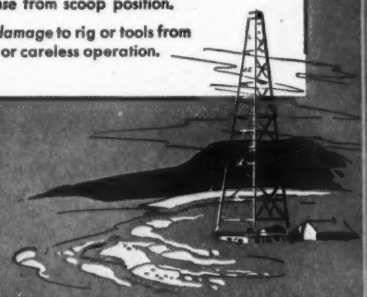
The National Supply Company, pioneer in the application of hydraulic couplings for drilling rigs, is the first to incorporate the Gýrol Fluid Drive as a built-in feature of power units.





Check These Outstanding Advantages:

1. New drive is much *more compact*—a real space saver.
2. Unique scoop control *eliminates* the use of the conventional friction *clutch power take-off* on engine.
3. Provides *smooth, rapid acceleration* at the *maximum power* of the engine.
4. Power transmitted from engine to transmission through a *cushion* of oil which is accurately *controlled*.
5. Drive is *more flexible* as well as *more serviceable* than any of its predecessors.
6. Permits operation of slush pump in *all variations* from full speed down to complete stall of the pump.
7. At *all speeds* of the pump, the engine may be run at *optimum speed*.
8. Fluid drive acts as a *speed reducer* with an infinite number of speed steps.
9. *Controlled torque* for driving the rotary machine.
10. *Controlled torque* for driving the hoisting drum.
11. Through *controlled slip* of the Gýrol, speeds slower than the range of the engine may be utilized for such delicate operations as fishing.
12. *Eliminates shock* on draw works and rotary machine as well as on the engines.
13. *Reduces maintenance* of rig and engines because of the softer drive.
14. *Provides longer life* to rigs and higher operating efficiency.
15. *Fewer moving parts* in fluid drive to wear or require replacement.
16. *Quicker response* from scoop position.
17. *Less chance of damage* to rig or tools from inexperienced or careless operation.



THE NATIONAL SUPPLY COMPANY

GENERAL SALES OFFICE: TOLEDO, OHIO

DIVISION OFFICES: CASPER; FT. WORTH; PITTSBURGH; TULSA; TORRANCE.
EXPORT: NATIONAL SUPPLY EXPORT CORPORATION, 30 ROCKEFELLER PLAZA, NEW YORK, N. Y., U. S. A. RIVER PLATE HOUSE, 12 SOUTH PLACE, LONDON E.C.2.

THE NATIONAL SUPPLY COMPANY — NSCO — NATIONAL BLUE PRODUCTS

LETE LINE OF OIL FIELD EQUIPMENT ★ FOR PRODUCTION

A NEW FEATURE . . . .

TURBO-SUPERCHARGING!

FOR THE POPULAR SUPERIOR PTD DRILLING ENGINE..

TURBO-SUPERCHARGING

Increases horsepower output approximately 60 per cent with only 15 per cent weight increase.

SUPERIOR ENGINE DIVISION OF

THE NATIONAL SUPPLY COMPANY

PLANT AND GENERAL SALES OFFICE: SPRINGFIELD, OHIO

★ THE INDUSTRY'S MOST COMPLETE LINE OF OIL FIELD EQUIPMENT ★

JOURNAL-*Series* ON

Petroleum Engineering *Time Savers*

3—Chart for Calculating Two-Phase Formation-Volume Factor

THE two-phase formation-volume factor is defined as the barrels of reservoir space that would be needed at any pressure and reservoir temperature to contain the equivalent of 1 bbl. of stock-tank oil plus all the gas which it carried in solution at the original reservoir pressure and temperature. The nomenclature used to designate the quantity is u.

At original reservoir pressure and temperature, the gas in question is all contained in solution and therefore the space occupied is all liquid. The two-phase formation-volume factor is then equal to the liquid-phase formation-volume factor. At pressures lower than the original, only part of the gas in question will be in solution. The two-phase volume is hence equal to the liquid volume at that pressure plus the volume occupied by the gas that is not in solution.

The quantitative expression of these statements is:

$$u_o = \beta_o \qquad (1)$$

$$u = \beta + (r_o - r)\,v \qquad (2)$$

where the subscript o refers to original conditions and:

- u = the two-phase formation-volume factor at pressure P, and temperature T_f, expressed as bbl. per bbl. of stock-tank oil.
- β = the liquid-phase formation-volume factor at P and T_f expressed as bbl. per bbl. of stock-tank oil.
- r = the amount of gas contained in solution at P and T_f expressed as standard cubic feet per barrel of stock-tank oil.
- v = the factor to convert standard cubic feet of gas to barrels of space at P, equal to $\frac{14.7\ T_f\ Z}{5.62 \times 520\ P}$.

The accompanying chart is based upon a calculation of u over two ranges using a knowledge of β, v, and $(r_o - r)$ at the pressure for which u is desired. It will be noted that since Equation 2 gives $(r_o - r)v$ as a product, the chart can be used over a wider range or to greater accuracy by shifting decimals. For example, $(r_o - r) = 60$ and $v = 0.002$ could just as well be read by letting $(r_o - r) = 600$ and $v = 0.0002$.

As an example, assume $r_o = 600$ cu. ft. per bbl., r at a lower pressure = 400 cu. ft. per bbl., and $(r_o - r) = 200$ cu. ft. per bbl. At this same pressure β, the liquid phase formation-volume factor is 1.30 and v is equal to 0.001. The chart then gives u from the left-hand u scale as 1.5 or $u = 1.3 + 200 \times 0.001 = 1.3 + 0.2 = 1.5$.

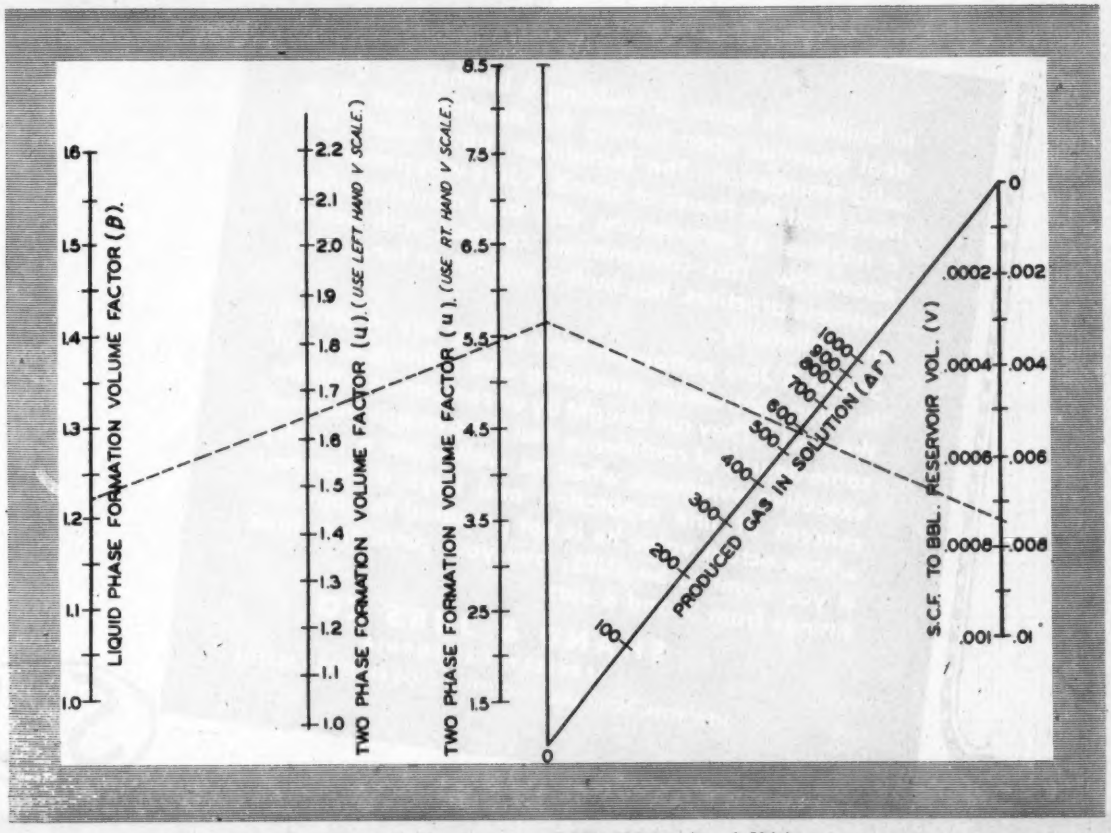

LIQUID PHASE FORMATION VOLUME FACTOR (β).
TWO PHASE FORMATION VOLUME FACTOR (u). (USE LEFT HAND V SCALE.)
TWO PHASE FORMATION VOLUME FACTOR (u). (USE RT. HAND V SCALE.)
PRODUCED GAS IN SOLUTION (Δr)
S.C.F. TO BBL. RESERVOIR VOL. (V)

Chart by F. W. Gooch and A. C. West, University of Oklahoma

Series by Dr. John C. Calhoun, Jr., Chairman, Petroleum Engineering School, University of Oklahoma

A HOUSE

OF QUALITY

In building a home or building a business, a great deal depends upon having the structure rest on a solid foundation. The foundation upon which we have built the House of Shand & Jurs was poured of a mixture of engineering skill and manufacturing know-how. This combination, coupled with sound business practices, has built a reputation for quality and reliability.

Shand & Jurs petroleum tank fittings are in service in every petroleum producing and refining area of the world. They are bought by oil companies with the same degree of confidence that the average business executive evidences when he walks into a jewelry concern of fine reputation and buys a diamond whose actual value he is not prepared to appraise. If you want to be SURE, buy your petroleum tank fittings from Shand & Jurs.

SHAND & JURS CO.

BERKELEY, CALIFORNIA

NEW YORK · CHICAGO · HOUSTON · LOS ANGELES · SEATTLE

S&J

SHAND & JURS

JOURNAL-*Guide* TO

Active Fields

Jameson Field

Coke County, Texas

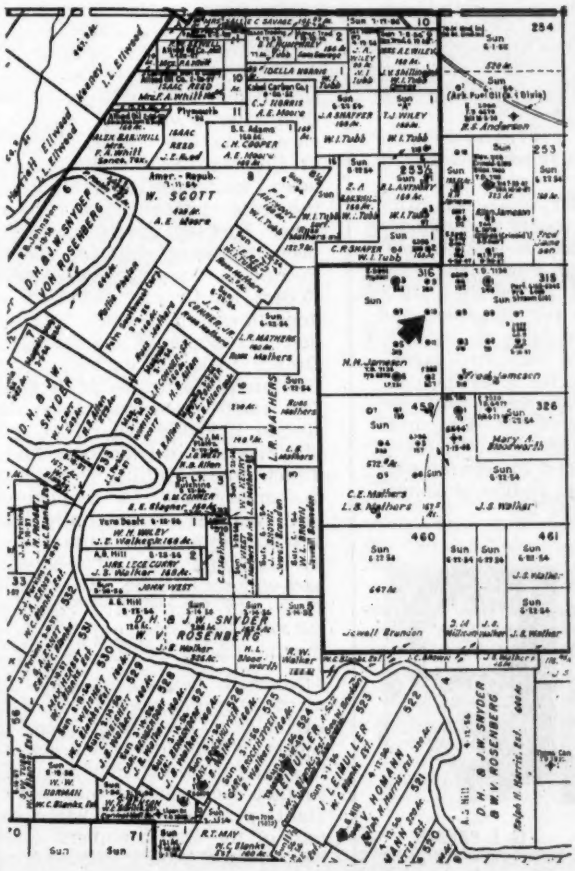
JAMESON (Strawn) field of northwestern Coke County, including wells across the river on the south, now comprises 32 completed oil wells, with 5 drilling at the present time.

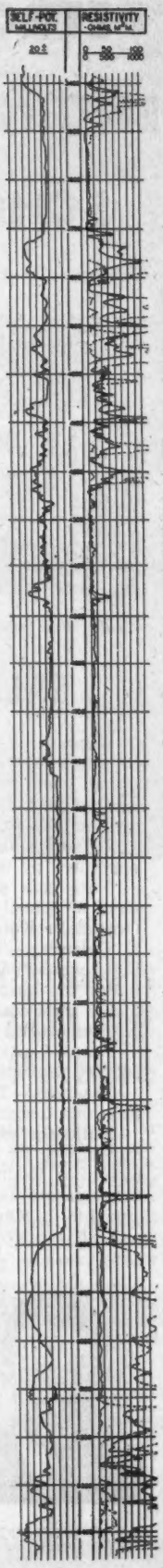
Pays.—All production is in the reef limestone of the Strawn, ranging from 5,800-6,200 ft. Some of the border wells have been small, but potentials on most have averaged from 200-600 bbl. per day. A number of tests have been carried through the Ellenburger and into the pre-Cambrian. A few of these showed oil in the Ellenburger when allowed to stand overnight, but did not develop commercial production.

Casing and bits.—Surface pipe and casing have varied on the wells. Surface pipe is either 10¾ or 9⅝-in., set from 600-800 ft. with 300 sacks. Both 7 and 5½-in. casing has been used, with some wells cased in to bottom and perforated in the pay zone, while others have casing set to top of the lime pay. Cement used has run from 500-600 sacks. Rock bits are used throughout in drilling. An average well has required one 13¾-in, two 12¼-in., sixty 8¾-in, and two 4¾-in. bits, the latter for drilling in, cement plugs, etc. Mud used in the above well consisted of: weight material, 500 sacks; jel 427 sacks; chemicals, including quebracho, caustic soda, ash, lime, and bicarbonate of soda, 114 sacks.

Contract terms.—Contracts have been on a footage plus day work basis. Operator prepares location, supplies mud and cement. Contractor supplies substructure, water, and fuel. Sufficient gas is available locally for drilling. All drilling has been with power rigs.

Drilling conditions.—No special problems have thus far been met in drilling. There are no high-pressure gas or water flow problems. Some of the wells, located on the crest or base of hills, have lost circulation around 200 ft. However, this problem is not thought to be serious. Drilling time, on the average, has been: Rigging up 2 days, drilling 40, running casing and waiting on cement 6, completion 5, total 53. Sun Oil Co. has drilled with its own crews but the majority of wells have been contracted.



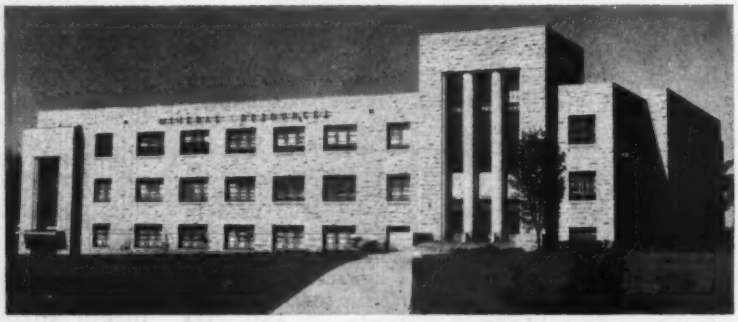


Left: Ownership map of Jameson field, showing present development. (Map courtesy Southwest Mapping Co., Fort Worth). Right: Representative electric log for field; black arrow on map shows location. (Courtesy West Texas Electric Log Service Co., Dallas and Midland)

PETROLEUM ENGINEERING SCHOOLS

No. 19 IN A SERIES

UNIVERSITY OF KANSAS



Lindley Hall, which houses the department of engineering at University of Kansas

SALIENT FACTS AND FIGURES

General.—University of Kansas was founded in 1864, and first opened its doors to students September 12, 1866. The institution was coeducational from the beginning. The annual enrollment is approximately 5,500 during normal times, but the influx of G.I.'s has temporarily increased this to about 9,500.

It is administered by a board of regents consisting of nine members, appointed by the governor of the state.

The main part of the university is located in Lawrence, but the medical school with hospitals, nurses' home, and extensive clinics is located in Kansas City.

Calendar.—The institution operates on a semester basis, consisting of 18 weeks each. A special summer session of 12 weeks is conducted under the auspices of the School of Education, although most departments offer courses of the same content as those given during the regular semesters.

Fees.—Tuition for residents of the state is $40 per semester, and $90 per semester for nonresidents.

Finances.—The university is supported primarily by legislative appropriations, designed to meet the needs of the institution for 2-year periods.

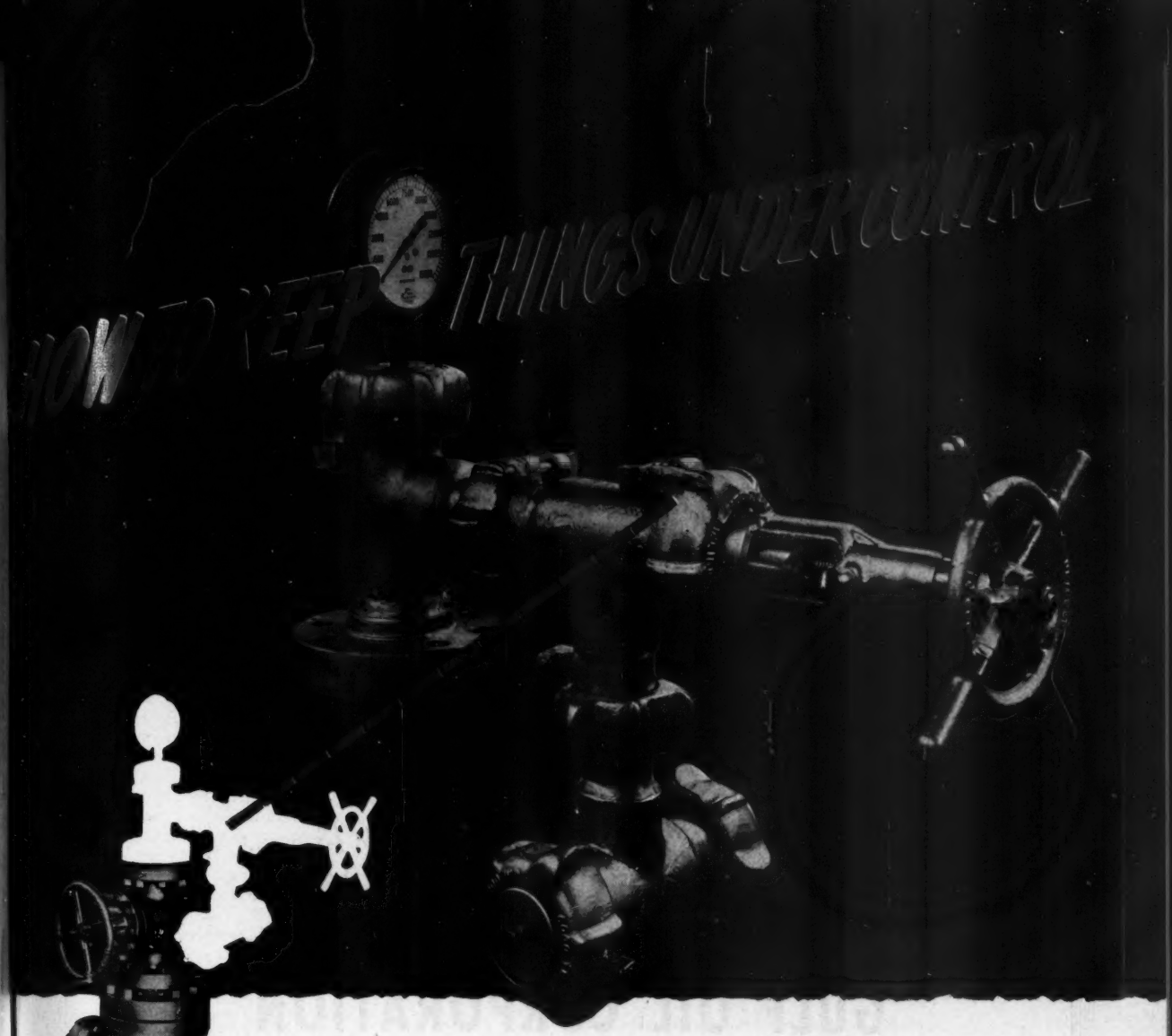
Buildings and grounds.—The campus comprises 182 acres, with the majority of its 35 buildings placed on a crescent-shaped hill, designated locally as Mount Oread. A general library houses most of the volumes, but separate departmental libraries are also maintained for engineering students in Marvin Hall and Lindley Hall. The radio station is known as KFKU, operating in cooperation with WREN on 1250 kc.

C. F. WEINAUG *E. L. ANDERS* *R. M. DREYER* *G. I. FREEZE*

THE department of petroleum engineering was established in 1937, although prior to that time a few courses dealing with oil and gas production had been given in the mining and mechanical engineering departments. The first department head was Dr. Eugene A. Stephenson, who came from Missouri School of Mines and Metallurgy, and who continued as head of the department until 1947.

Beginning in September 1948, Dr. Charles F. Weinaug will be chairman of the department, coming to Kansas from University of Texas where he held the rank of associate professor. Dr. Weinaug took both his master's (1939) and doctor's degrees (1942) at University of Michigan, then spent 4 years with Phillips Petroleum Co., in the research department; in 1946-48 he has been on the staff of the department of petroleum engineering at University of Texas. Ellis L. Anders is also a member of the faculty with the rank of assistant professor. Anders was graduated from University of Texas (1940) and then after 2 years' practical experience in various Texas fields, taught at Colorado School of Mines for 2 years, while also completing most of the requirements for his master's degree. For the past 2 years he has been reservoir engineer for Creole Petroleum Corp. in Venezuela. Dr. Robert M. Dreyer, chairman of the department of geology, teaches the descriptive course in geophysics. Dr. Dreyer took his doctor's degree at California Institute of Technology. The rank of instructor is held by Gerald I. Freeze, who is a graduate of University of Oklahoma, and came direct from Phillips Petroleum Co. in January 1948. Dr. Stephenson has been granted an indefinite leave of absence, but will continue to serve as a counselor for the department, and will occasionally give special lectures and the course "Appraisal of Oil and Gas Properties," while retaining the rank of professor.

Normally the departmental enrollment is approximately 125 students, exclusive of freshmen. From its inception the policy of the department has been to stress small-sized classes, so that each student may have constant personal supervision on the part of the staff members. Emphasis has always been placed on fundamentals, and throughout its engineer-



FEATURES:

The UNIBOLT Tee (Cross if double wing tree is desired) is a 3" size with 2½" flanged inlet and 2" side outlet. This unequal combination is particularly desirable in high pressure areas because its over-size bore permits the use of standard lubricators; however, it is available in any combination of sizes desired.

A UNIBOLT Adjustable Wing Valve takes the place of a gate or plug valve. Since high pressure wells are usually produced thru a small choke, resulting in low velocity flow thru the tree, the 1-inch opening in this valve is ample to assure unrestricted flow.

A UNIBOLT Choke Body, fitted with positive bean and blanking plug, provides a proven dependable, safe and convenient means for controlling the well flow. The blanking plug is removed by releasing a single bolt. The Choke Body is designed to receive either UNIBOLT "X" Type Beans (drilled in increments of 10% of well flow), or regular beans drilled in increments of 1/64".

Here's What Happens When You Fit UNIBOLT FLOW MANIFOLDS Into Your Christmas Tree Picture

In keeping with the trend toward light and simplified production control equipment, the UNIBOLT Flow Manifold was designed to eliminate much of the bulk and weight of conventional trees. Yet, because the patented UNIBOLT design places a greater area of metal in shear, this manifold actually provides a higher factor of safety than the heavier flanged manifolds.

The use of a UNIBOLT Adjustable Wing Valve instead of an ordinary gate or plug valve on the wing is an innovation that has met with the approval of numerous operators due to the fact that it not only costs substantially less but can also be completely overhauled without removal from the well.

Another important advantage of the UNIBOLT Flow Manifold is its complete interchangeability. All connections in the manifold are standard forged steel UNIBOLT Couplings, and any unit in the assembly, or part thereof, may be easily and quickly replaced in the field without removing the manifold from the well.

See Your Composite Catalog for complete details, or write direct for literature.

THORNHILL-CRAVER COMPANY

HOUSTON UNIBOLT TEXAS

UNIBOLT *Flow Manifold*

GULF

A complete line of
quality petroleum products

GULF OIL CORPORATION
GULF REFINING COMPANY

General Offices, Pittsburgh 30, Pa.

Refineries:

NEW YORK, N. Y.
PHILADELPHIA, PA.
PITTSBURGH, PA.
TOLEDO, O. · CINCINNATI, O.
PORT ARTHUR, TEX.
FORT WORTH, TEX.
SWEETWATER, TEX.

Sales Offices:

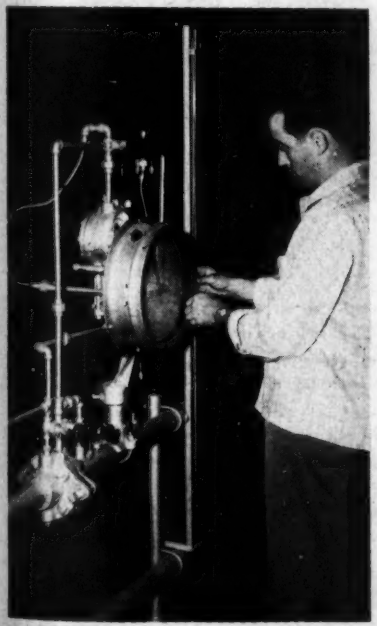
BOSTON · NEW YORK
PHILADELPHIA · PITTSBURGH
TOLEDO
LOUISVILLE · ATLANTA
NEW ORLEANS
HOUSTON

ing courses the department stresses behavior of the reservoir contents.

Details of Courses

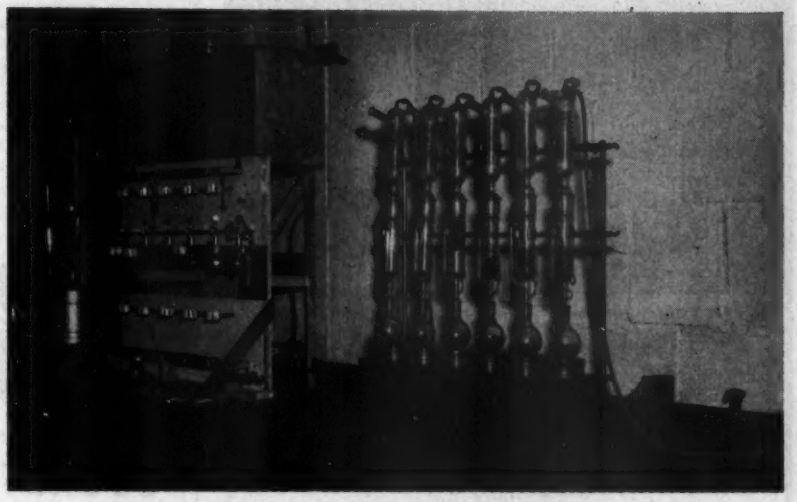
The department offers two separate courses, one in petroleum-production engineering and the other designated geologic option in petroleum engineering. The former is designed to train men for positions as petroleum engineers and the latter is devised for those men who wish to specialize in geology to a greater extent than is permitted in regular liberal arts courses in geology. The following courses are offered: (a) **Introduction to Petróleum Engineering** — A general survey course whose objective is to provide the student with a comprehensive view of the various phases of the vast petroleum and natural gas industry, and the part played by engineering therein (2)*; (b) **Development of Oil and Gas Lands**—A course covering the various types of oil and gas land acquisition and control, drilling and completion practices, together with methods for the control of the wells during these processes (3); (c) **Introductory Petroleum Engineering Laboratory**—The properties of crude oil that are important in its production, transportation and storage, and have a bearing on price; properties of drilling fluids, and methods of modifying these to adapt the fluid to the various conditions encountered in drilling and completion (1); (d) **Natural-Gas Engineering** — The fundamental gas laws; deviation from ideal behavior; measurement of gases; sampling and testing of gas wells; thermodynamics of gas compression; transmission of gases (5); (e) **Theoretical Principles of Reservoir Behavior**—The flow of fluids through porous media; the relation of changes in pressure to the changes in the properties of the reservoir fluids; uses of equilibrium constants; single-phase and multiphase flow; interpretation of data obtained by means of bottom-hole samples and laboratory investigations (3); (f) **Advanced Petroleum Engineering Laboratory**—Use of bottom-hole instruments, calibration of same, properties of reservoir rocks, changes in properties of saturated fluids with pressure and temperature changes (1); (g) **Special Problems in Petroleum Engineering**—A course designed with sufficient flexibility to introduce undergraduate and graduate students to many of the research problems under investigation at the present time (1-3); (h) **Methods of Oil Production** — Studies of current production practices, with emphasis on methods for recovery of maximum quantities of oil and gas, and minimum waste thereof (3); (i) **Appraisal of Oil and Gas Properties**—Corporate structures of oil companies; general accounting procedures; estimates of oil and gas reserves, (a) decline curves, (b) volumetric estimates, (c) various material balance computations; effects of different operating programs on recoverable reserves (2-3).

*Note: Number in parentheses indicates the number of credit hours per semester.



A corner of the gas-measurement laboratory

Students at work in laboratory for first-year petroleum engineers



Part of the advanced petroleum-engineering laboratory

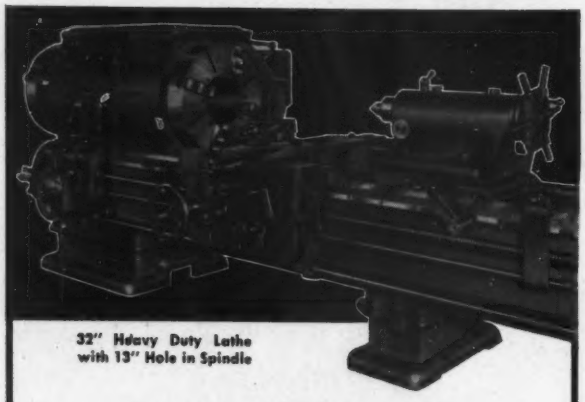
A number of scholarships and fellowships have been and are available, sponsored by industrial concerns, some of which also provide for summer employment at the end of the junior and senior years. Graduate work is encouraged and work may be taken that leads to the master's degree in petroleum engineering. For such work additional courses in chemistry, physics, and mathematics may be required, and at least 1 year of two semesters in residence. Superior students are encouraged to take the advanced degree and ample facilities are available for research.

The department is housed in spacious quarters in a new building known as Lindley Hall, or the Mineral Resources Building, where the laboratories for beginning and advanced courses are segregated and a special laboratory is also set aside for natural gas investigations.

Graduates of the department hold important positions with many major and independent oil companies, and the demand for graduates has always exceeded the available supply.

HYDRATROL *Lathes*

LARGE HOLLOW SPINDLE TYPE



32" Heavy Duty Lathe with 13" Hole in Spindle

Recognized as the

HIGHEST STANDARD *for* OIL FIELD *Work!*

18"—20"—25"—32"—36" Swing, with Spindle Holes to 16⅛"

LEHMANN Machine Company has specialized in the development of Oil Field Lathes for many years, and our Hollow Spindle HYDRATROL is today recognized as the highest standard for this work. Note that there is a size to suit any Oil Field requirement.

In hundreds of shops, HYDRATROL Lathes are setting new records for speed, accuracy, dependability, economy. They operate with almost unbelievable smoothness, and do extremely close tolerance work. *You'll* do it *better* on a Hollow Spindle HYDRATROL Lathe!

Also Standard Hydratrol Lathes, Sizes 16" to 36"

•

Send us Prints, for a Specific Recommendation

LEHMANN *Machine Co.*

CHOUTEAU AT GRAND • ST. LOUIS 3, MO.

NO-CO-RO

means *Non-Corrosive!*

THE BIG THING TO LOOK FOR IN OIL WELL VALVE CHECKS

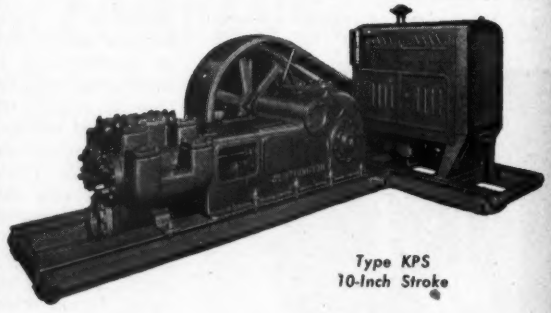
Norris Brothers pioneered the use of special-analysis alloy steel for valve checks and have consistently maintained their leadership ever since. NO-CO-RO Alloy is made to our own specifications, based on countless experiments and directed to the specific job of meeting the conditions encountered in oil wells. It will not chip. It will not pit. And it will not corrode. All of which makes NO-CO-RO Balls and Seats the logical choice of operators who buy on performance and insist on lowest possible replacement and pulling costs.

Back of No-Co-Ro Balls and Seats is a record of 44 years' service to the oil industry.

Norris Brothers, INC.

ROBINSON · ILLINOIS

LOCKETT-WORTHINGTON POWER-DRIVEN PUMP UNIT



Type KPS
10-Inch Stroke

THIS Worthington Pump—like all other Worthington Pumps—can be fitted to operate with any type, or manufacture, of Engine or Motor. For dependable performance and lasting satisfaction, let a "Lockett Dealer" supply your pump-equipment needs!

Worthington Pumps and *genuine* Worthington Repair Parts are availble — through Lockett Dealers — from warehouses which are maintained at, or near, the principal oil fields throughout Texas and Louisiana, backed up by a large replenishing stock at our Houston and New Orleans Warehouses.

A. M. LOCKETT & COMPANY, LTD.

NEW ORLEANS HOUSTON DALLAS

DIGESTS

A.C.S. MEETING, ST. LOUIS, SEPT. 6-10

Presented here are reports of the papers presented at the recent meetings of the Divisions of Petroleum Chemistry and Gas and Fuel Chemistry, American Chemical Society. Meetings were held in St. Louis, September 6-10, 1948.

Progress in Chlorination

E. T. McBEE, Purdue University, Lafayette, Ind.

DURING the past few years, progress in chlorination has involved many new developments in techniques and commercial preparations. In the field of insecticides, DDT, benzene hexachloride, and chlordan have been produced commercially. The production of chloroacetic acid has increased considerably because of its large-scale use in the preparation of indigo, carboxymethylcellulose, and 2,4-dichlorophenoxyacetic acid.

Chlorination of olefins and paraffins has received much attention, with the emphasis on development of new techniques. The work has been directed especially toward achieving a smooth, controllable reaction. Research in chlorination has also been directed to nitrogen-containing compounds, such as amides and nitriles; heterocyclics, as thiophene and furan, and many other classes of organic compounds.

New processes have been developed for the production of polychloroparaffins from natural gas hydrocarbons. The polychloropentanes and polychlorobutanes have been converted by a novel process to hexachloro cyclopentadiene and hexachlorobutadiene, two very commercially promising chlorocarbons. Polychloropropanes are converted readily to carbon tetrachloride and tetrachloroethylene.

The Synthesis of Fluorocarbons

R. D. FOWLER and CLIFFORD E. WEBER (present address, General Electric Co., Research Laboratory, Schenectady, N. Y.), Johns Hopkins University, Baltimore, Md.

PRIOR to early 1942 there was no general satisfactory method for the synthesis of fluorocarbons. A few attempts had been made to make fluorocarbons by two general methods: (1) chlorination of hydrocarbons followed by replacement of chlorine with fluorine by means of antimony pentafluoride or other inorganic materials, and (2) the direct replacement of hydrogen by fluorine through the use of elementary fluorine. The first method was not successful in introducing more than two or three fluorine atoms into a hydrocarbon molecule and the second resulted in excessive destruction of the Molecule, and consequently, very poor yields. In late 1941 and early 1942 the cobalt trifluoride method for the introduction of fluorine into hydrocarbons was developed by the author and his coworkers at Johns Hopkins University.

This method consists in the passage of hydrocarbon vapor over a bed of cobalt trifluoride maintained at a temperature of 150° to 400° C. Complete replacement of hydrogen by fluorine occurs with yields that are generally very good, being as high in many instances as 96 per cent of theoretical. Some of the apparatus involved is described, and typical products, such as perfluoro-n-heptane, perfluorodimethylcyclohexane, and perfluroro oils, are discussed in detail. Various physical and chemical properties such as boiling and melting points, refractive indiex, and chemical reactivity are discussed. The direct replacement of hydrogen by fluorine, using elementary fluorine, which was successfully worked out by Von Grosse and Cady and resulted in good yields, is discussed. The possibilities inherent in more roundabout methods involving condensation reactions, such as those worked out by Miller, are also discussed.

Preparation of Allylic Chlorides

G. W. HEARNE and T. W. EVANS, Shell Development Co., Emeryville, Calif.

THE allylic chlorides have recently come into prominence as chemical intermediates through various reactions involving either the olefin linkage or the reactive chlorine atom. Some general characteristics of the allylic chlorides are outlined, including the allylic rearrangement which accompanies many of the reactions. The mechanism underlying the synthesis of allyic chlorides by several methods is considered. These include the low-temperature chlorination of isobutylene and its homologs, the high-temperature chlorination of the straight-chain olefins, dehydrochlorination of polychlorides by pyrolysis or treatment with alkali, and the addition of hydrogen chloride and chlorine to diolefins.

The Chemistry, Properties, and Uses of Chlorinated Rubber and Chlorinated Paraffin

D. R. WIGGAM, W. T. Kiessling, and J. B. MARTIN, Hercules Powder Co., South River, N. J.

THE chlorinated hydrocarbons include chlorinated rubber and chlorinated paraffin. Methods of preparation and manufacture are discussed with particular reference to a description of those reactions which affect rates. The more important physical properties of the chlorinated products are described and related to the most significant commercial uses. The film-forming characteristics of chlorinated rubber and its chemical inertness are of special value in chemically resistant protective coatings and paints. The flame resistance of fabrics impregnated with chlorinated paraffin together with water repellence is useful for tents, tarpaulins, and awnings. Chlorinated paraffin also finds applications in high pressure lubricants and paints of low burning rate.

Relation Between Road and Laboratory Knock Ratings

J. B. DUCKWORTH, G. T. MOORE, and C. J. DOMKE, Standard Oil Co. of Indiana, Chicago.

STUDIES of knocking characteristics of motor fuels in current automobiles, together with observations of public driving habits, indicate that representative customers will ordinarily evaluate gasoline knocking qualities at low car speeds. Although road-knocking performance for new-type motor fuels or new engine design must be evaluated in highway service, the corresponding performance of current gasolines in available automobiles may be evaluated in terms of laboratory correlations herein presented and demonstrated. The best correlation has been found to be that between road ratings and research octane numbers as modified by motor ratings.

Multicylinder Engine Distribution, A Serious Limitation to Future Engine Design

R. W. DONAHUE, Sun Oil Co., Marcus Hook, Pa.

AS engine compression ratios and octane numbers go up, the old problem of the uneven distribution of air and fuel to the various cylinders of a multicylinder engine offers opportunity for possible improvements in the engine-fuel relationship. This paper discusses some of the fuel and engine variables which influence the quantity and the quality of fuel reaching the various cylinders.

Three principal factors are evaluated. First, engine-design features which affect the mixing of air and fuel are shown to be of prime importance. The second factor, fuel volatility, often singled out for criticism in the distribution problem, is shown to have only a small effect. The third factor, the octane quality of the fuel in its various fractions over the boiling range, is also shown to be of prime importance. In evaluating this latter factor, samples of fuel actually reaching each cylinder were recovered and analyzed for octane quality. The balancing of octane quality throughout the boiling range is suggested as one phase of the mixture distribution problem worthy of further evaluation by refiners.

Effect of Engine Design and Fuel Quality on Car Performance and Fuel Economy

J. M. CAMPBELL and L. L. WITHROW, Research Laboratories Division, General Motors Corp., Detroit.

SINCE 1930 the average efficiency of fuel utilization in passenger-car engines expressed in ton-miles per gallon of gasoline, has increased by more than 30 per cent. This very significant development is the result of the combined efforts of the petroleum and automotive industries to raise the octane ratings of gasolines and to build engines to take full advantage of these improvements in fuel quality.

Looking toward the future, tests with high-compression engines installed in automobiles show that further gains in fuel utilization of the same order of magnitude as those obtained in the past are still possible by continued development of both fuels and engines by the petroleum and automotive industries. To the chemist and the chemical engineer, the problem of producing fuels suitable for commercial use in engines of higher efficiency presents one of the most outstanding opportunities for engineering achievement in the years ahead.

Antiknock Quality Requirements Of High-Compression-Ratio Passenger-Car Engines

R. W. SCOTT, G. S. TOBIAS, and P. L. HAINES, Esso Laboratories, Research Division, Standard Oil Development Co., Elizabeth, N. J.

IN order to determine the antiknock requirements of high-compression-ratio gasoline engines, road-antiknock studies

HAUL HUGE LOADS...

in any terrain...in any weather!

with the great
Power + Traction of
WALTER
TRACTOR TRUCKS

"Weather-proof" hauling

● The exclusive Walter 4-Point Positive Drive provides great power and unfailing traction to haul tremendous loads at good speeds—without bogging down or stalling on soft ground, mud, sand, slippery surfaces or steep grades. Three patented automatic locking differentials act as a "mechanical brain" insuring a positive drive to all four wheels. Only the wheels having traction get the power. None is wasted on helpless, spinning wheels.

The biggest hazard to hauling heavy oilfield equipment, is bad weather and difficult running conditions—as you well know from sad experience. The most common cause is the fact that conventional "heavy-duty" trucks cannot haul off the road when the going gets tough.

The use of big, powerful, 100%-traction Walter Tractor Trucks is insurance against such hauling failures and delays—and keeps your rigs, pipe and servicing equipment moving on schedule, regardless of hauling conditions. Write for detailed folder explaining the advantages of Walter Tractor Trucks.

WALTER MOTOR TRUCK CO.

1001-19 Irving Ave., Ridgewood, Queens, L. I., N. Y.

employing the borderline technique have been conducted on 16 gasolines varying in composition, octane number, and tetraethyl lead content in four cars having engines specifically designed to operate at compression ratios of 8.0, 8.0, 10.0, and 12.5 to 1, respectively. Similar evaluations were also made in two cars of present-day design, one equipped with a 7.5 and the other with a 9.0 to 1 compression-ratio engine head.

The data indicate that the antiknock quality requirements of the engines in terms of laboratory octane numbers may be generalized as a function of compression ratio varying at sea level from 93 research octane number for 8.0 to 1 compression ratio to 102 research octane number for 12.5 to 1 compression ratio. Furthermore, in high-compression-ratio engines the research octane number requirement is limiting, and fuels of greater laboratory appreciation apparently can be tolerated as compression ratio is increased.

Octane Performance in High-Compression Engines of Gasolines Prepared by Selective Blending Of Gasoline Distillates From Present-Day Refining Processes

W. C. OFFUTT, J. E. TAYLOR, and G. B. SWARTZ, JR., Gulf Research & Development Co., Pittsburgh.

THE automotive and petroleum industries should develop engines and fuels simultaneously in order that the engines and fuels may be properly matched, and any upgrading of the fuel-antiknock-quality requirements of automotive engines should be established sufficiently ahead of the engine production so that the refiner can develop techniques to produce satisfactory fuels economically.

Recently it has been shown that the mechanical barriers to high-compression ratio can be controlled by proper attention to mechanical designs. Consequently, it can be anticipated that an upward trend in compression ratio will be established as soon as new techniques are developed to produce economically motor fuels sufficiently high in octane rating to permit satisfactory operation of such engines. Since conventional engines with stepped-up compression ratios do not rate fuels the same as specifically designed high-compression engines, test data must be obtained on the newly designed engines.

The data presented in this paper summarize the road-octane performance of several blended gasoline distillates from operating refinery processes in specially designed engines of 8 to 1, 10 to 1, and 12.5 to 1 compression ratio. Since the hydrocarbon-type composition has been shown to affect the road performance of motor fuels, a complete hydrocarbon analysis is shown for the fuels rated.

Motor Gasoline From Middle East Crude

C. V. HILL, H. T. LORNE, and A. R. MERCER, Anglo-Iranian Oil Co., Ltd.

A REVIEW is presented of possible refining schemes applicable to Middle East crude with emphasis on the production of motor gasoline. The schemes are typified by considering Iranian crude and are based on maximum conservation of middle distillates. Yields and properties of straight-run gasoline clear and leaded are given. The effect of raising octane number by thermal reforming or hydroforming on yield of total gasoline is examined. Finally, catalytic cracking or heavy gas oil (wax distillate) is used to obtain a premium grade gasoline or to increase the yield and octane of the bulk gasoline. The results of these studies are discussed in the light of the possible adoption of a two-fuel system.

The Quality of Synthetic Gasoline From Natural Gas

F. H. BRUNER, The Texas Co., Fishkill, N. Y.

GASOLINE produced in this country by the fluidized iron-catalyzed hydrogenation of carbon monoxide is of much higher quality than that produced commercially in Europe by the Fischer-Tropsch fixed-bed, cobalt-catalyzed process. In contrast to the high-boiling, paraffinic material produced over cobalt, the hydrocarbons produced by the American process are relatively low boiling and highly olefinic. The olefinicity permits the conversion of the gasoline to a high-octane fuel or blending stock by a simple catalytic treatment. A 7-lb. R.v.p. 400° F. end-point naphtha has a C.F.R.M. clear octane of 82 and a C.F.R.R. octane of 92. The synthetic fuel blends normally in straight-run and cracked products.

Production of High-Octane-Gasoline Components

A. A. DRAEGER, G. T. GWIN, C. J. G. LEESEMANN, and M. R. MORROW, Humble Oil & Refining Co., Baytown, Tex.

THE evolution of refining processes for the production of gasoline has been based on increasing both antiknock quality and the yield of gasoline from crude. The high-octane characteristics of aromatics, isoparaffins, and iso-olefins as hydrocarbon classes has resulted in a trend toward catalytic refining for the production of gasoline-boiling-range hydrocarbons of these types. Theoretical considerations involved in the various processes for production of these high-octane-gasoline components are discussed. The processes discussed include catalytic cracking for producing high-octane gasoline from gas oils as compared to the older thermal cracking process; catalytic alkylation and polymerization processes used to convert light refinery olefins to high-octane gasoline; and processes such as hydroforming, isomerization, aromatization, and thermal reforming for upgrading the quality of gasoline-boiling-range fractions. Included are calculations to show the effect of utilizing these processes in an arbitrary sequence on the yield and octane quality of the gasoline pool for a given refinery situation.

Analysis of a Gasoline Produced By Catalytic Cracking

AUGUSTUS R. GLASGOW, JR., CHARLES B. WILLINGHAM, and FREDERICK D. ROSSINI, American Petroleum Institute Research Project 6, National Bureau of Standards, Washington, D. C.

THIS report describes the analysis, with respect to individual hydrocarbon components, of a gasoline produced by the catalytic cracking process. The analysis was made by utilizing the processes of distillation and adsorption.

Separation of the Gas-Oil and Wax Fractions of Petroleum By Adsorption

BEVERIDGE J. MAIR, ALBERT J. SWEETMAN, and FREDERICK D. ROSSINI, American Petroleum Institute Research Project 6, National Bureau of Standards, Washington, D. C.

RESULTS are reported on the separation of the gas-oil and wax fractions of petroleum by adsorption with silica gel. In a single-pass operation, the gas-oil fraction can be separated into three portions: a portion which is a mixture of paraffins and cycloparaffins, a portion which is largely mononuclear aromatics, and a portion which is largely polynuclear aromatics. Similarly, the wax fraction (aromatic-free) can be separated into two portions: a portion which is largely paraffins and a portion which is largely cycloparaffins.

Data are also given on the effect, on the separation of the gas-oil, of changes in several of the factors affecting the separation, including the temperature of operation, diameter of the fractionating section, and length of the fractionating section. A simple analogy between fractionation by adsorption and fractionation by distillation is drawn.

A Method for Calculating Performance Characteristics of Multicomponent Motor Fuel Blends

J. S. BOGEN and R. M. NICHOLS, Universal Oil Products Co., Research and Development Laboratories, Riverside, Ill.

A METHOD and substantiating data are presented for estimating the performance characteristics of multicomponent motor-fuel blends. The scope of this investigation covers the four major components of motor fuel—straight-run, thermal cracked, polymer, and catalytic cracked gasoline from Pennsylvania, Illinois, Mid-Continent, and California crude sources. Multicomponent blends which covered practical commercial concentrations were made and rated by F-1, F-2, and F-8B (modified borderline procedure) methods, clear and with 1 and 3 ml. of tetraethyl lead per gallon.

A series of curves was obtained from which it is possible to estimate the performance characteristics of multicomponent motor fuel blends. Future work will include stocks from other crude sources.

Separation of the 177° to 200° C. Fraction of Petroleum and the Isolation of Normal Undecane

MORTON B. EPSTEIN, BEVERIDGE J. MAIR, CHARLES B. WILLINGHAM, and FREDERICK D. ROSSINI, American Petroleum Institute Research Project 6, National Bureau of Standards, Washington, D. C.

THIS report describes the separation of the 177° to 200° C. fraction of petroleum (Ponca, Okla., crude) by means of regular distillation, azeotropic distillation, adsorption, and crystallization. A regular distillation at high efficiency with high reflux ratio separated the original petroleum into a series of substantially constant-boiling fractions. Appropriate blends of material of nearly the same boiling point were subjected to azeotropic distillation to produce a separation of the aromatic hydrocarbons from the paraffinic and cycloparaffinic hydrocarbons, with a partial separation of the latter two classes from each other. The fractions intermediate between the aromatic hydrocarbons and the paraffins plus cycloparaffins were further processed by adsorption to separate all the aromatic hydrocarbons. The azeotropic distillation yielded fractions very rich in n-undecane, and from these a pure sample of n-undecane was separated by crystallization.

Aviation Knock Ratings of Aromatics and Ethers

H. C. BARNETT and I. L. DRELL, National Advisory Committee for Aeronautics, Washington, D. C.

A RESUME is presented of knock ratings, obtained by the National Advisory Committee for Aeronautics on aromatics and ethers individually blended with paraffinic reference fuels. F-3 and F-4 ratings for 50 compounds are compared on the basis of molecular structure. Some supercharged 17.6 engine and full-scale single-cylinder data are also included. Blending charac-

teristics of the compounds are briefly discussed.

Quenching Oils. Methods of Evaluation and the Influence of Oil Composition on Quenching Ability

H. D. BURNHAM, Shell Oil Co., Inc., Wood River Research Laboratories, Edwardsville, Ill.

SUBSTANTIAL differences in the quenching speeds of several oils have been demonstrated by both metallurgical and thermal methods of testing. A new thermal method, the hot-wire quench test, designed to measure relative heat transfer ratings was found to be particularly useful for routine analysis of quenching oils and laboratory development of premium quality products. The metallurgical cone tests are valuable as an end test and demonstrate visibly and by hardness measurements the advantages to be gained from the use of a premium oil of high quenching speed. By the use of thermal methods of analysis some of the physical and chemical factors influencing the choice of base stocks and additives used in the compounding of accelerated quenching oils were investigated.

The Determination of Inorganic Chlorides in Crude Oils by Direct Electrometric Titration

R. E. DICKEY and L. V. SORG, Standard Oil Co. (Ind.), Sugar Creek, Mo.

EXISTING methods for the routine determination of inorganic chlorides in crude oil are similar in that it is necessary first to extract the chlorides with water, and then to determine the chlorides in the aqueous extract. These methods are time consuming, and difficulty is encountered in obtaining consistently reproducible results, particularly between different laboratories.

A procedure has been developed by which it is possible to titrate directly the inorganic chlorides in crude oil without preliminary water extraction. This procedure utilizes the precision-shell titrometer to carry out a direct electrometric titration in a nonaqueous solvent. A silver electrode is used as the indicating electrode and a high-resistance glass electrode as the reference electrode, the titrating solution being standard silver nitrate in 90 per cent isopropyl alcohol.

A wide variety of crude oils from various producing fields have been analyzed for inorganic chlorides, and the direct electrometric-titration method has been found applicable in all cases. The presence of hydrogen sulfide and/or moderate amounts of mercaptans does not impair the precision of the method.

The precision and accuracy of direct electrometric titration have zeen shown to be adequate for control purposes. For crude oils containing inorganic chlorides equivalent to 0 to 300 lb. of sodium chloride per 1,000 bbl., a maximum deviation of 5 lb. of sodium chloride per 1,000 bbl. may be expected.

The Use of Coprecipitated Chromia-Alumina Catalysts for Naphtha Reforming With Hydrogen

E. C. HUGHES, H. M. STINE, and S. M. DARLING, Standard Oil Co. of Ohio, Cleveland.

PERFORMANCE of a coprecipitated chromia-alumina catalyst in the reforming of naphtha in the presence of hydrogen was found to be equivalent to published results obtained with molybdene-alumina catalyst. The activity and stability of the chromia-alumina catalyst were achieved primarily by careful control of the pH during precipitation at a value close to 10, and of the chromia-alumina mole ratio at a value of about 20/80. Stability tests showed the catalyst to be resistant to high temperatures and to the presence of water vapor and organic sulfur compounds. The use of moderate hydrogen pressures (100 to 150 psi.) with the catalyst resulted in an appreciable increase in liquid yield, and a corresponding decrease in carbon laydown, which made possible the extension of on-stream periods to lengths of 12 to 24 hours. At these moderate pressures the process was found to be self-sufficient in hydrogen. Any increase in hydrogen pressure had a repressive effect on the reactions, requiring an increase in temperature to maintain conversion. Observations indicated that the dehydrocyclization proceeded through an olefin intermediary, and that the repressive effect of hydrogen probably was due to reversal of this initial dehydrogenation. The sensitivity of chromia catalyst toward hydrogen is offered as a possible explanation of differences between chromia and molybdena catalysts which have been reported in the literature.

Development of Synthesis Gas Process in Experimental Unit Operating on Entrained Powdered Coal

J. J. S. SEBASTIAN, P. W. EDEBURN, F. BONAR, and L. D. SCHMIDT, U. S. Bureau of Mines, Synthesis Gas Production Branch, Morgantown, W. Va.

A LABORATORY-SIZE pilot unit has been designed and a method developed for the gasification of 10 to 30 lb. of pulverized coal per hour by entrainment in oxygen and steam at generator temperatures ranging from 1,800° to 2,400°. The experimental unit described was developed for the dual purpose of: (1) obtaining the necessary engineering design data for the construction of large-scale units producing synthesis gas from powdered coal; (2) testing various types of fuels for their relative value in synthesis gas production.

A brief discussion is given of the principles of aerodynamics applied in the process utilizing a turbulent downward flow of oxygen, steam and product gases, which carry the powdered coal and residual dust along in a thorough entrainment, inside of an 82-in. long vertical refractory tube of 6-in. i.d. Typical data obtained in 37 runs made under widely different operating condtions are included in the paper. Graphical analysis and study of the operating results led to several conclusions which appear to be useful in controlling the quality of the synthesis gas produced and in predicting yields and efficiency under various given combination of operating conditions.

Sulfur-Resistant Catalysts for Reforming Propane Method for Rating Catalytic Activity and Sulfur Resistance

J. J. S. SEBASTIAN and C. H. RIESZ, Institute of Gas Technology, Chicago.

THE need for a sulfur-resistant catalyst for catalytic cracking or reforming propane and other light hydrocarbons in the presence of steam has become apparent in the gas industry in recent years. The objective of reforming is the conversion of the hydrocarbon into a low specific gravity carrier gas for subsequent enrichment by propane, butane, or other gases to provide a substitute gas for the gas normally supplied by a gas utility. This process has particular application in meeting the extreme peak loads which arise from the demands of space-heating customers. Since emergency situations may require the use of available materials, regardless of sulfur content, the development of sulfur-resistant catalysts is vital.

In the course of the investigation, devoted primarily to a study of the elements of the subgroups of Groups V, VI, and VIII of the Periodic Table, it became necessary to develop a method for the rapid testing and objective rating of catalytic activities and sulfur resistance of a large number of contact materials. The method evolved rates the catalytic activity according to the approach to equilibrium which is attributable to the catalyst only, due correction being made for the slight activity of the catalyst carrier. The sulfur resistance is obtained in an identical test of standard length (3 hours) but in the presence of a given concentration of hydrogen sulfide.

A total of 72 catalysts were tested, 50 of them prepared during the course of the work and 22 secured from various sources. The best results were achieved with nickel sulfide prepared on alumina support in a molecular ratio of 1 to 2. Such catalysts were both active and sulfur resistant for the catalytic reforming of propane with steam. Nickel oxide, nickel carbonate, and molybdenum sulfide also were found effective under certain conditions.

Estimated Cost of Producing Heavy Fuel Oil by the Hydrogenation of Coal

L. C. SKINNER, R. W. DOUGHERTY, E. A. CLARKE, H. D. LEVENE, and L. L. HIRST, U. S. Bureau of Mines, Research and Development Branch, Bruceton, Pa., and Coal to Oil Demonstration Branch, Louisiana, Mo.

THE current short supply of heavy fuel oil from petroleum refining has stimulated a search for supplementary sources of supply. Bituminous and subbituminous coal can be easily converted into an oil which may be readily burned in existing equipment. The Bureau of Mines, Office of Synthetic Liquid Fuels, has made a study of the possible methods, and has selected two for comparative purposes: direct hydrogenation and a combination of hydrogen and extraction. The makeup hydrogen is produced either by gasification of coal or by low temperature separation from coke-oven gas.

In the direct hydrogenation method, pulverized coal is liquefied in the presence of an excess of hydrogen at approximately 900° F. and 700 atmospheres pressure. The products of the reaction are distilled in conventional equipment to remove the low boiling components in order to make a finished product.

The hydrogenation step in the combination process is essentially the same as in direct hydrogenation. The principal difference is that the main product is a middle oil having a 635° F. e.b.p., which is used as the solvent in the extraction step. Pulverized coal and solvent are heated to about 800° F. under a pressure of 150 atmospheres for 1 to 1.5 hours. The extract is filtered to remove the solids and undissolved coal. The low-boiling components and part of the solvent are separated by distillation.

Gasoline, liquefied petroleum gases, and phenols are obtained as byproducts in both processes.

The capital investment for a plant to produce 10,000 bbl. per day by each process has been estimated with hydrogen obtained by (a) coal gasification and (b) by separation from coke-oven gas.

Estimated material quantities and operating costs have been computed. They indicate that the cost of producing a fuel oil suitable for industrial use from coal is not much more than the prices paid for petroleum residual fuel oils during the past year. The authors believe that such plants will be economically practical in the near future, if the present trend of prices for petroleum residual fuel oils continues.

AMERICAN IRON 4 POINT PROTECTION!

STABILIZER SEAL---

***Plus* THREAD SEAL-----**

***Plus* INSIDE SEAL----**

***Plus* SHOULDER SEAL---**

Here's real protection against joint leakage in your drilling string! American Iron's advanced, simplified design for these *Straight Grip* Tool Joints provides an *inside seal* . . . giving you *four* sealing areas! Furthermore, this simplified design so controls the reduction of area that the *seal becomes tighter* as high tension loads and pump pressure *increase!* Repeated tension tests prove that these tool joints are *three times* as strong as the drill pipe they connect!

Designed right; made right; and installed right . . . these *Straight Grip* Tool Joints lead the field for simplicity of design — and efficiency of performance!

AMERICAN IRON & MACHINE WORKS CO. OKLAHOMA CITY U.S.A.

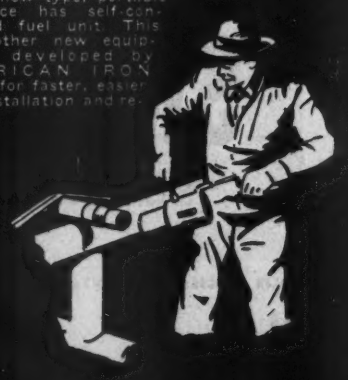
AMERICAN IRON

Straight Grip TOOL JOINTS

THREE TIMES AS STRONG AS THE PIPE THEY CONNECT

SIMPLIFIED Field Installation and Removal

Our new type, portable furnace has self-contained fuel unit. This and other new equipment developed by AMERICAN IRON makes for faster, easier field installation and removal.



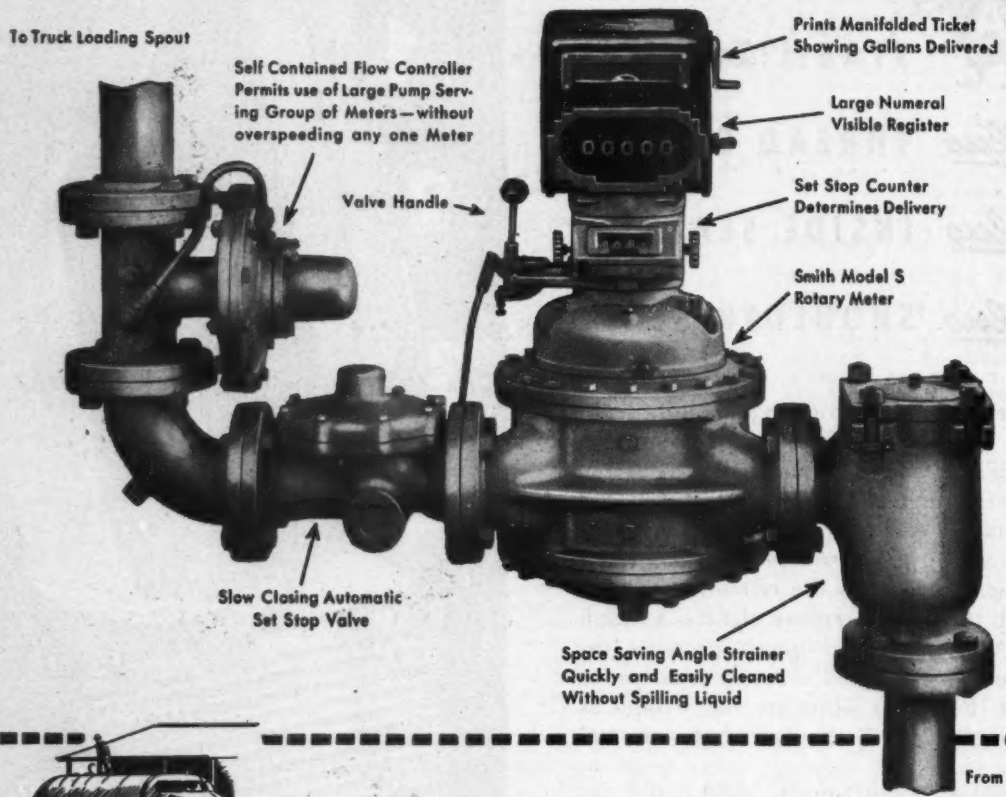
AMERICAN IRON & MACHINE WORKS CO.

Oklahoma City, Okla.—Box 1177—Phone L. D. 518
Dist. Office, Houston, Texas
Export Office: 420 Lexington Ave., New York City, N. Y.

Also manufacturers of A. P. I. and "Amweld" (counterbore weld) Tool Joints

SMITH METER COMPANY OFFERS *Automatic*

METERED TRUCK LOADING


To Truck Loading Spout
Self Contained Flow Controller Permits use of Large Pump Serving Group of Meters—without overspeeding any one Meter
Valve Handle
Prints Manifolded Ticket Showing Gallons Delivered
Large Numeral Visible Register
Set Stop Counter Determines Delivery
Smith Model S Rotary Meter
Slow Closing Automatic Set Stop Valve
Space Saving Angle Strainer Quickly and Easily Cleaned Without Spilling Liquid
From Pump

Truck Loading Racks equipped with meters having automatic set stop and ticket printing registers permit truck loading with a minimum of operators. One operator can easily load four trucks simultaneously without sacrificing accuracy or control of the loading operation. The result is lower operating cost and positive control of the quantity delivered. Smith meters are made in various sizes with equipment and accessories to suit varying delivery conditions. All are built on the simple SMITH ROTARY PRINCIPLE, dependable, accurate and fast, *the design that revolutionized the meter industry.*

SMITH METER COMPANY

SUBSIDIARY OF A. O. SMITH CORPORATION

Factory—5743 Smithway, Los Angeles 22, Calif.

SALES OFFICES: NEW YORK, CHICAGO, HOUSTON, LOS ANGELES • LOCAL STOCKS AT CONVENIENT POINTS • LOCAL AGENTS IN ALL PRINCIPAL CITIES

Casing Cementing and Perforating Practices

(Continued from page 70)

itself is a testimonial to the effectiveness of the new technique. Shortly after the scratchers had been inaugurated, there began to occur complaints in a few areas of difficulties in perforating the casing or in obtaining sufficient productivity from some of the wells. About the same time there began to appear in the trade journals, articles describing various tests with standard perforating guns that indicated the projectiles from this equipment lacked the penetrating power generally assumed for them.

From the information gained during the study of the cementing problem, it became apparent why little trouble from this source had been previously experienced. It had been learned that, in the conventional casing-setting process, the cement slurry not only failed to remove the mud cake, but actually bypassed portions of the drilling fluid leaving vertical channels in the cement surrounding the casing. Under such conditions a relatively few bullets penetrating to the mud cake or to channels in the cement would suffice to obtain ample production from the well. Formation pressures forced out mud cake or mud fluid, providing passages which permitted a few effective holes in the casing to communicate with a relatively large surface area of the producing formation.

In the new cementing process, with the mud cake removed from the walls, and a fairly uniform thickness of cement surrounding the pipe, production is obtained only from those bullet holes completely penetrating the cement. Apparently the number of these has been quite small in some wells, and in instances where it has been necessary to break down the perforations with pressure before getting any production whatsoever, it is apparent that none of the projectiles got completely through into the producing formation.

In many areas it has become common procedure to force oil into the perforations to increase production from wells cemented by the scratcher-centralizer method. There can be little doubt, however, that the mechanism responsible for the enhanced production consists of breaking the bond between the cement and the formation, or fracturing of the cement, or both. Such an expedient tends to defeat the original purpose of the special cementing procedure, and it appears possible that ill effects may result from the practice as the depletion of the wells progress.

Jet-Perforating Process

A more logical and straightforward attack on the problem consists of attempting to improve perforating performance, and fortunately considerable progress has been made in this direction. Some improvement has been accomplished by increased powder loads behind the projectiles and by using extended barrels on the perforating guns. The most promising advance, however, has come from the adaptation of a development of the last war, and is known as the shaped-charge or jet-perforating process.

In this method, the mechanism of which is not fully understood, penetration is achieved by focusing the energy in an exploding charge, with a seemingly insignificant quantity of solid projectile involved in the shot. The application of the process in oil wells has been retarded because of patent complications and secrecy measures imposed by the War Department. However, in recent months it has gained considerable impetus in California and is now making headway in oil-field operations in the Gulf Coast. Demonstrations have shown that shaped-charges of the size used for shooting casing will penetrate about 4 in. of fairly hard steel, whereas the best perforating gun bullet will barely bury itself in mild steel. The same charge will perforate proportionally greater thicknesses of cement or sandstone, and without

Rust Preventive Stops Rust Effectively

EVANSTON, ILL.—The oil industry's ancient enemy, rust, can be licked at low cost with Rust-Oleum. It's highly resistant to dampness, brine, fumes, and general weather conditions. Rust-Oleum gives lasting protection for all rustable metal surfaces—indoors or out.

Rust-Oleum forms a tough, enduring coating that protects roofs, tanks, machinery, pipes, structural steel, metal buildings, and other rustable metal from the ravages of rust. Rust-Oleum outlasts ordinary protective materials two to ten times, depending on conditions under which it is used.

Maintenance men hail Rust-Oleum's cost-cutting advantages. It can be applied to new metal or on rusted metal after quick, easy preparation, and gives extra coverage per gallon.

GET THE FACTS— MAIL THIS COUPON TODAY!

RUST-OLEUM CORPORATION

2469 Oakton Street, Evanston, Illinois

Please send free copy of Rust-Oleum Catalog with color selections and recommended uses.

Name.....*Title*.....

Firm.....

Address.....

Town.....*State*.....

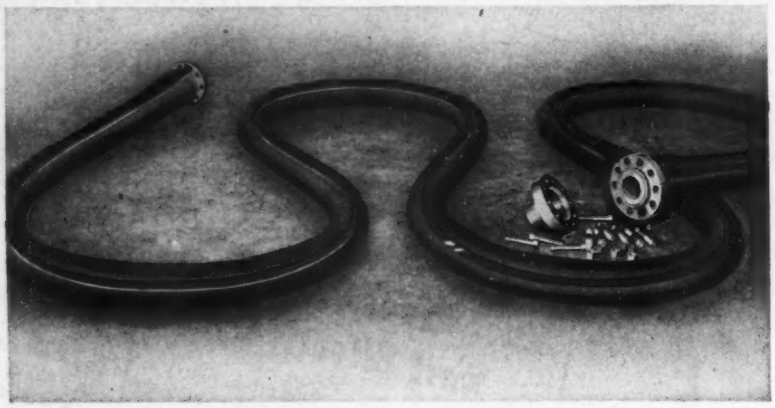
EXPANDED PRODUCTION FACILITIES MAKE

Thermoid

Powerflex Rotary Hose
available now for

IMMEDIATE DELIVERY

from factory or warehouse



Strength *plus* Flexibility

This fifty-foot length of 3-inch Thermoid* Powerflex Rotary Hose snaked out shows no strain or kink in the hose at any time. Thermoid Powerflex PRESSURE SEAL Rotary Hose can be coiled into smaller diameter without injury than any type of rotary hose — whether light or heavy duty.

*Formerly Grizzly

THERMOID PRODUCES AND SELLS MORE ROTARY HOSE THAN ANY OTHER MANUFACTURER

Rotary Brake Blocks—Woven Oil Field Brake Linings—Slush Pump Hose—Flexible Discharge Unit Hose—Production and Refinery Hose of all types—V-Belts and Drives—Oil Country Belting—Stuffing Box Rings—"No Wip" Line Savers—Wire Line Turn Backs—Pin Type Pipe Protectors—Molded Products

Thermoid
Company

Main Offices and Factory · Trenton, N. J., U. S. A.
Western Offices and Factory · Nephi, Utah, U. S. A.
Industrial Rubber Products
Friction Materials · Oil Field Products

fusing the surface as had originally been feared.

An attempt was made recently to test the penetrating powers of this type of shooting in a well of low productive capacity at Baxterville, Miss., but the results were inconclusive. However, there are a number of inconsistencies in the behavior of wells in that field, and further experiments will be required to determine whether the low-productivity wells are ineffectively perforated.

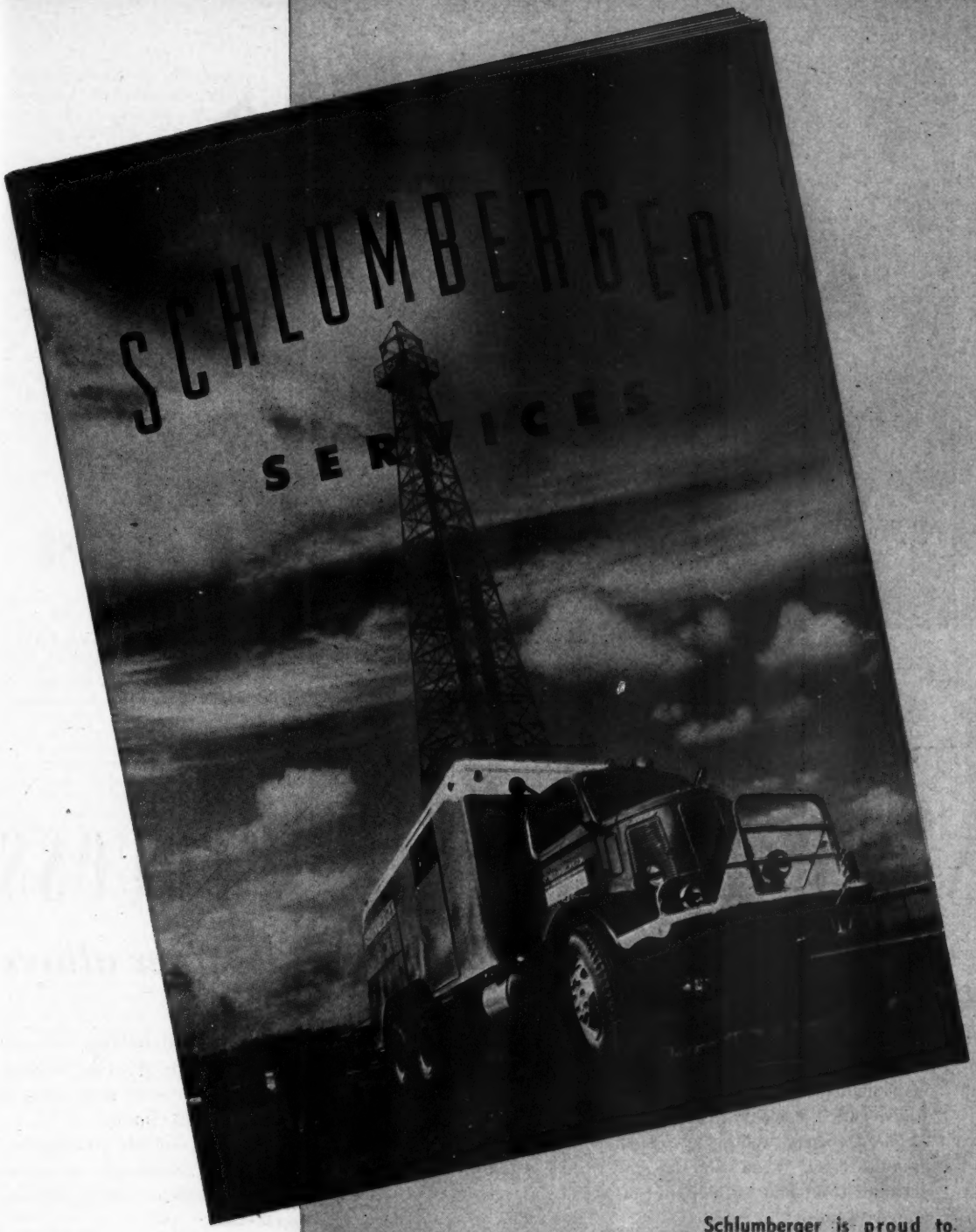
La Grange Field Next Move

Fortunately there is other information on the capabilities of this shooting method that can be reported at this time. Upon leaving the job at Baxterville, the perforating unit moved to La Grange field in Mississippi to shoot a well. Casing in this well had been cemented with scratchers and centralizers, and a 7-ft. section had been perforated and reperforated (a total of six operations) by each of three different servicing companies. However, the well was still producing at a low rate, making 27 bbl. per day on pump. After being shot with one gun containing 24 shaped charges, the well began to flow at the rate of 100 bbl. per day.

A short time later, a somewhat similar job was done at Blue Lake, Tex. In this instance 5½-in. casing had been set in 9⅞-in. hole and cemented with scratchers and centralizers. The casing had been shot five or six times with ordinary gun perforators but had yielded only dry drill-stem tests. The well was then acidized and the subsequent drill-stem test showed approximately 10 psi. surface pressure. As a final measure, the same interval was perforated with four shaped-charge shots per foot, and the well came in flowing with a tubing pressure of 1,960 psi.

Recently another test of this shooting process was made on a well in Pierce Junction field. In two similar wells previously drilled in this field, it had been found necessary to perform several perforating jobs and acidize in order to obtain satisfactory production. In the third well, as an experiment, it was decided to dispense with the ordinary perforating and the acidizing, and employ only the shaped-charge shooting. A single trip with this new type gun was found sufficient to bring the well in with the expected production rate.

There may be another hazard involved in the inadequate shooting of casing which has a good cement seal, especially in formations having low vertical permeability. If the well is produced through a few scattered openings in the casing, there is danger of depleting the formation in streaks, bypassing some of the reservoir fluid and thus reducing the ultimate recovery. It also appears likely that in some oil wells the restriction of flow to a few casing perforations might shorten the productive life by in-



17 OILFIELD AIDS

Schlumberger is proud to present, for the first time under one cover, descriptive and dimensional data on all of its seventeen oil field services.

If you have not already received your copy, the nearest Schlumberger field office will gladly send one on request, or write direct to Schlumberger Well Surveying Corporation, Houston, Texas.

The high-temperature, corrosion-resistant alloys, of which aircraft turbo superchargers are made, are easily and quickly joined by the UNIONMELT welding process.

The UNIONMELT Process

a fast, easy way to join plain and super alloys

The UNIONMELT process of welding electrically, without flash, glare, or spatter, produces sound, high quality welds of smooth, clean finish—welds which while hot are protected by a molten covering of fused special welding composition applied in granular form. When cool, the fused composition detaches itself and no chipping or peening is required to finish the weld.

The high welding currents, characteristic of the process, produce uniform welds of extremely deep penetration at high speeds. In welding alloy steels and non-ferrous metals, special welding rod and sometimes special types of the granular welding material are used to produce weld metal of the composition and characteristics required.

LINDE Engineering Service can help you whether your job involves UNIONMELT welding or any other of the numerous LINDE methods for joining, cutting, forming or treating metals.

Call or write any LINDE office for a copy of booklet F-6077, which fully describes UNIONMELT welding.

Linde
Trade-Mark

THE LINDE AIR PRODUCTS COMPANY

Unit of Union Carbide and Carbon Corporation

30 East 42nd St., New York 17, N.Y. UCC Offices in Other Principal Cities

In Canada: DOMINION OXYGEN COMPANY, LIMITED, Toronto

The terms "Linde," and "Unionmelt," are registered trade-marks of The Linde Air Products Company

creasing the draw-down pressures, thus accelerating the encroachment of edge water, or of gas, through the more permeable portions of the sand.

Perhaps in some sands sealed by casing, efficient production cannot be obtained by any type of shooting, but requires a means of producing holes which cross the bedding planes in the sand. A method for accomplishing penetration of this type is now in the development stage, and only needs some encouragement from the oil industry to acquire the status of a practical process.

It is suggested that results as beneficial as those obtained from the study of cementing practice might be achieved by a similar investigation of the casing perforating phase of oil-well completion.

BOOKS

A GUIDE TO TECHNICAL WRITING. By W. George W. Crouch and Robert L. Zetler. Published by Ronald Press Co. 15 E. 26th Street, New York. 401 pp. $4.

This book on technical writing is designed as a practical aid for the undergraduate student and for practicing technical men. The material has been divided into two main sections: (1) the techniques of various kinds of communications, (2) a review of the principles of writing and a grammatical index. The business letter, the technical article, the report, the abstract, and types of oral communication are included in the first section. "Language Essentials" reviews fundamental principles which every writer—and every speaker—must observe. The "Index of English Usage" which follows has been arranged alphabetically for easy reference and has been limited to essentials of English and grammar which the technical man must employ. The business letters, although considerably changed by the authors, have originated in large part in the files of American corporations. Principles concerning the technique of article writing have been derived from analysis of many technical and semitechnical articles published in various journals. Report problems are actual ones. The speech material concerns itself, with topics commonly discussed by technical men. Even many of the illustrations in "Index of English Usage" are drawn from business letters and technical reports. Throughout, the style has been kept informal, even conversational. Abbreviations of common words, a few colloquial expressions, the omission of relative pronouns, where ease is so obtained, and simplicity of diction are present by design. The aim is to have as readable a text as possible.

THE PETROLEUM REGISTER, 1948. Published by Petroleum Register, 794 Stanford Avenue, Los Angeles. $15.

The current twenty-sixth volume of this annual directory and register of all active oil enterprises throughout the world contains 91 more pages than its predecessor of 1947. The book is divided into a United States and a foreign section, and each enterprise is described with reference to its history, capital and corporate structure, affiliations and subsidiaries, concessions properties, and facilities for production, manufacturing, transportation, and distribution. Names and addresses of its directorate and important personnel are given, along with incidental information of interest to users. Individual operators are listed.

Ampco Tools give you an Edge over hazards

Be sure your men use Ampco Safety Tools near dangerous, explosive fumes, gases, or dust

Here's a *new* safety tool. It's a bronze floor-scraper with a serrated cutting edge that sharpens itself as it works. And that's just one of more than 500 types and styles of safety tools you can get from Ampco. All are approved by Factory Mutual Laboratories and other safety authorities for jobs in hazardous locations.

Follow the example of hundreds of safety-minded plants. Use an Ampco Safety tool on *every* dangerous job. That's the way to make your safety program really work! Helps you earn low insurance rates, too. And it adds to job efficiency by making your workers feel secure. Write for Ampco's illustrated 28-page catalog today.

Ampco Metal, Inc.

Dept. OG-9 Milwaukee 4, Wisconsin

AMPCO

In Canada, contact Safety Supply Co., Toronto

5-38

RESISTS
ACIDS • ALKALIES
OILS • GREASES
ALCOHOLS • WATER
•
TOUGH • FLEXIBLE
•
EASY TO APPLY
QUICK DRYING

TYGON *Plastic* PAINTS

TYGON plastic paints are made from pure Tygon, the corrosion-resistant plastic used to line acid tanks. They differ from ordinary paints in these important ways:

• Tygon Paint films are flexible when dry, and stay that way. They will not oxidize and become brittle; will not check, crack, or craze.

• Tygon Paint films are not affected by oil, water, or sunlight, nor by most acids and alkalies. 1000 hours of continuous salt spray tests left Tygon Paint films untouched.

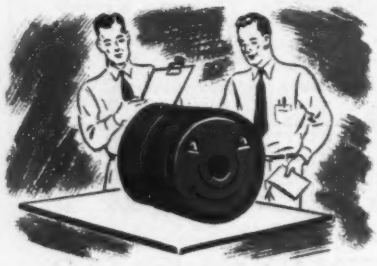
• Tygon Paint films are tough, and durable. They will not chip under impact, are slow wearing under abrasion.

Tygon Paints are easily applied by spray gun or brush. Available in a wide range of colors, including black, white, and clear.

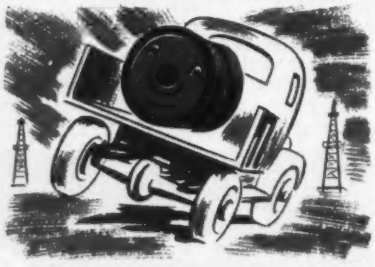
U. S. STONEWARE

Akron 9, Ohio

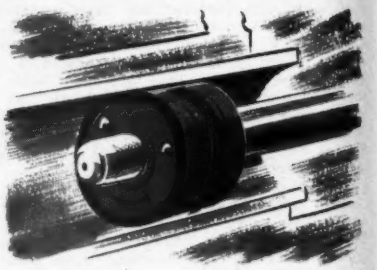
or "how I reduce PUMP UPKEEP COSTS"



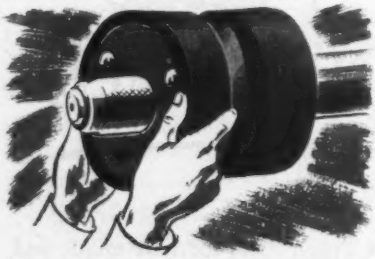
O BOY! I PASSED INSPECTION... and that's a tough job with these Mission Inspectors. They check everything from my surface finish to my toughness.



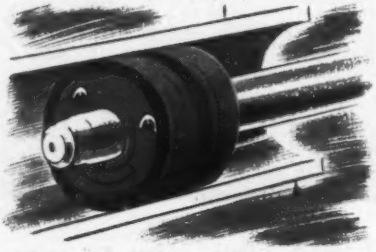
I DIDN'T STAY LONG AT THE SUPPLY STORE. The demand is so great for Mission Pistons that the men said we were among their fastest moving items.



WELL, HERE I AM ON THE JOB! I've already been plugging away so long that the derrick man is beginning to wonder if I will ever wear out.



DON'T GET EXCITED . . . I'M NOT GONE YET! I'll be as good as new when my rubbers are changed. Notice that they don't even have to take me off the rod to change my rubbers.



BACK TO WORK AGAIN. I may not have nine lives . . . but I have so many that I am by far your best buy in pistons.

Mission MANUFACTURING CO.

P. O. BOX 4209, HOUSTON 14, TEXAS

EXPORT OFFICE: 30 Rockefeller Plaza, New York 20, N. Y. • EUROPEAN ADDRESS: London, England

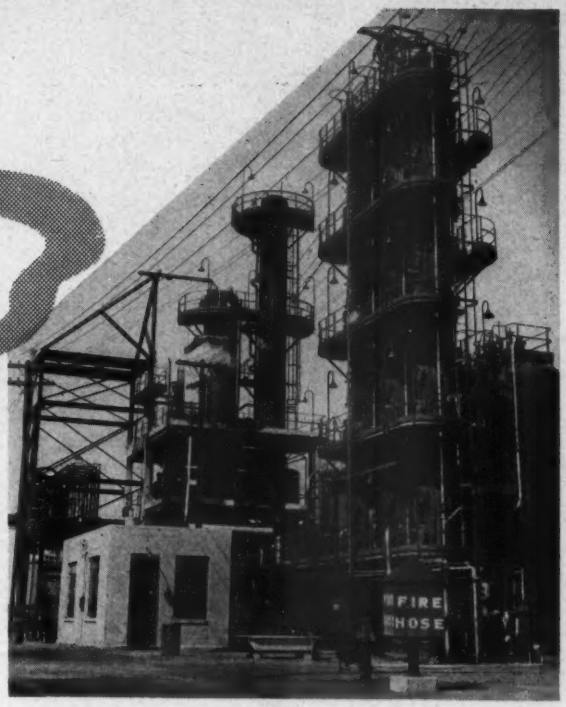
8107

Atlantic Refining Co.'s First Year With

UNISOL Process

Doctor Waits 4 Years to Sample His Own Medicine

by R. D. Bent and J. H. McCullough**



View of Atlantic's 19,000-bbl. Unisol plant

THIRTEEN years ago Schulze and Buell[1] pointed out the adverse effect of sulfur compounds on octane rating and tetraethyl lead suceptibility. Their observations spurred investigations by many organizations and led to the generally accepted conclusion that reactive sulfur compounds should be removed wherever possible instead of simply being converted to other forms of sulfur.

*Atlantic Refining Co.

In the case of The Atlantic Refining Co., recognition of the effect of sulfur compounds on octane quality led to extensive development work on the use of caustic-methanol solutions for extracting mercaptans from gasoline. During the late thirties the use of caustic methanol was developed through large-scale pilot-plant work[2,3,4] into the Unisol process as it is known today.

With the development work successively completed, Atlantic set out to design a large unit for its Philadelphia refinery and at the same time entered into an agreement with

TABLE 1—UNISOL-PLANT TREATING OF VARIOUS NAPHTHAS

	Gray tower motor stock								W. Texas Permian straight-run naphtha	
	High sulfur*		Low sulfur†		Stabilite‡		Z-gas naphtha§			
	Inlet	Outlet	Inlet	Outlet	Inlet	Outlet	Inlet	Outlet	Inlet	Outlet
Boiling range	85-406	85-406	92-389	91-385	....	....	128-414	128-414	90-318	90-318
Gravity, °A.P.I.	59.1	59.1	62.3	61.3	....	....	56.4	56.3	69.5	69.6
R.v.p.	10.8	10.8	10.8	9.2	31.6	31.6	....	....	10.8	10.8
Weight per cent S (Lamp)	0.140	0.086	0.074	0.054	0.236	0.040	0.224	0.160	0.155	0.057
RSH Mg./100 cc.	44.10	0.82	17.3	0.54	128	Nil	41	0.7	68.0	0.5
Weight per cent as RSH	0.059	0.0011	0.0236	0.00074	0.195	Nil	0.0545	0.00093	0.097	0.0007
Corrosion at 122° F.	OK	OK	Not OK	OK	OK	OK	OK	OK	OK	OK
A.S.T.M. gum	....	....	.2	.2	....	....	....	....	....	....
Cu Dish gum	7	3	8	1	....	....	....	13	1	1
Doctor test	Not OK	Not OK	Not OK	Not OK	Not OK	OK	Not OK	Not OK	Not OK	Not OK
A.S.T.M. distillation:										
10	152	152	141	143	....	....	194	193	120	121
30	204	208	203	202	....	....	230	232	154	154
50	236	236	239	238	....	....	256	256	181	184
90	343	345	347	344	....	....	353	353	250	250
M.M. octane, cc. TEL:										
0	70.2	70.5	67.3	67.3	81.2	82.6	73.9	74.0	70.0	70.9
0.5	73.8	74.4	72.0	72.6	82.7	84.6	....	....	73.0	74.7
1	75.4	76.3	73.6	75.2	84.0	88.0	77.5	77.8	75.2	78.0
2	77.7	79.0	76.5	78.0	88.4	91.8	78.7	79.4	....	....
3	79.4	80.5	....	....	....	....	80.3	80.9	81.2	84.7
Res. octane, cc. TEL:										
0	77.5	77.6	72.6	73 0	81.7	83.9	84.0	84.0	68.0	69.3
0.5	81.5	82.3	76.1	76.9	88.6	92.0	....	....	71.1	73.5
1	83.3	84.3	79.0	80.4	93.0	95.6	88.0	89.6	73.3	76.3
2	85.8	87.2	82.5	83.7	97.3	99.5	91.0	92.1	....	....
3	87.2	89.0	....	....	....	....	92.0	93.2	79.0	82.9

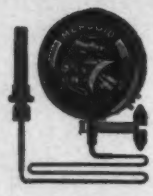
*Blend of thermal refined H.S. naphtha-V.B. naphtha. †Blend of now-sulfur thermal refined V.B. naphtha. ‡C_4 to C_7 fraction from high-sulfur thermal cracked gasoline. §Blend: 40 per cent poly and 60 per cent thermal cracked high-sulfur naphtha. H.S. naphtha: A.P.I. 52.3, per cent RSH 0.115, per cent S 0.340, over 135, dry 414.

IN DESIGNING
YOUR PUMPS you will need many bolts and studs involving special material, heat treatment, and threaded to close tolerances. You will be writing the specifications for the type of bolting that has made ERIE known from Coast to Coast. We have supplied the heavy industries with their specials for many years.

Send your bolting specifications to a specialist

Erie Bolt & Nut Co.
SUBSIDIARY OF BARIUM STEEL CORPORATION
Erie, Pa.

★MERCOID CONTROLS★
FOR HEATING, AIR CONDITIONING, REFRIGERATION, AND VARIOUS INDUSTRIAL APPLICATIONS


TEMPERATURE CONTROLS

MERCOID RELAYS

EXPLOSION PROOF PRESSURE CONTROL

MERCOID HAS WHAT EXPERIENCED ENGINEERS WANT IN AN AUTOMATIC CONTROL

1. Designed for positive safety—*the prime purpose of a control.*
2. Built for years of dependable performance—*a very desirable feature.*
3. Simplified for ease of installation—*appreciated by the trade.*
4. Convenient facilities for making understandable adjustments—*no time lost in calculating or guesswork.*
5. The only 100% Mercury Switch Equipped Control Line—*which means that all "makes" "and breaks" in the electrical circuit are hermetically sealed, therefore immune to dust, dirt, corrosion, open arcing, pitting, or sticking of contacts—all common causes of contact trouble. Mercoid Switches provide an electrical contact that will give millions of perfect operations.*

The above facts merit your consideration. For detailed information see Mercoid catalog No. 600.

MERCURY SWITCHES

LIQUID LEVEL CONTROLS

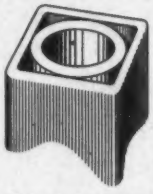
THE MERCOID CORPORATION • 4201 BELMONT AVENUE • CHICAGO ILLINOIS

MORE Circulation with LESS Pressure
with the Guiberson FUL-FLO SQUARE KELLY

You get fluid circulation in much greater volume at low pump pressures with the Guiberson Ful-Flo Kelly, because it has twice as much fluid opening as conventional bored forged kellys. Built like a truss, with round seamless tube welded inside square seamless tube, for maximum strength with minimum weight.

- **Smooth, straight sides**
- **smooth, seamless inner wall**
- **perfectly balanced—no whip**
- **overlapped and fish-mouthed construction**
- **tested at 3,000 p.s.i.**

Ideal for drilling, reverse circulation or clean-out work with Guiberson H, GH or EI Drilling Heads or any conventional rotary.



Reg. U. S. Pat. Off.

Size	Overall Length	Bottom Connection	Top Connection	Size Opening
2½"	18½ ft. 21½ ft. 23½ ft.	2" A.P.I.—8 Rd. Thd. Upset	3" L.H. 8 Rd. Thd. Int. Upset Drill Pipe	1⅛"
3"	21½ ft. 23½ ft. 26½ ft. 36 ft.	2½" A.P.I.—8 Rd. Thd. Upset	3" L.H. 8 Rd. Thd. Int. Upset Drill Pipe	1¾"

For full information see 1948 Composite Catalog, page 1524, or write to

1948, The Guiberson Corp.
Guiberson U.S.A.
Established 1919
THE GUIBERSON CORPORATION
GENERAL OFFICES: DALLAS, TEXAS
EXPORT OFFICE: 30 Rockefeller Plaza, New York 20.
CALIFORNIA DISTRIBUTOR: W. B. Guiberson Co., 717 E. Gage Avenue, Los Angeles 1.
BRANCH OFFICES: Oklahoma City and Tulsa, Okla.; Alice, Houston, Kilgore, Longview, Odessa, and Wichita Falls, Tex.; Lafayette, La.; Wichita, Kan.; Newark, Ohio.

Universal Oil Products Co. to license other refiners. At this point tradition was upset; generally the originator of a process makes the first commercial application, but in the case of the Unisol process, wartime restrictions resulted in a lapse of 4 years before the "doctor sampled his own medicine," and during this period nine other refiners with applications directly affecting war products adopted the process. It is this sampling, the first year's operation of Atlantic's Philadelphia Unisol plant, with which we are here concerned.

Process Flow and Equipment

The 19,000-bbl.-per-stream-day capacity Philadelphia Unisol plant was started up in February 1947. This plant is designed to process two gasoline streams; one a low-boiling volatility-blending stream locally known as "stabilite" and the other a full-range reformed gasoline. Fig. 1 is a flow diagram of the unit. Since with one exception, the flow is identical to that previously described in detail for the process,[2,3,4,5,6] only a brief description will be given here.

In common with other Unisol plants, the raw gasoline is first contacted with dilute caustic to remove hydrogen sulfide. Differing from most Unisol plants, a portion of the prewashed gasoline is contacted with water methanol from the mercaptan separator. The additional step of contacting water methanol with prewashed gasoline removes the small amounts of mercaptan in the water methanol that are distilled over with the recovered methanol. Mercaptan in the recovered methanol tends to raise the mercaptan content of the treated product and makes it more difficult to obtain a product of superior odor quality. On the other hand, the same mercaptan distributed back to the raw feed has no measurable effect due to the tremendous carrying power of the caustic methanol reagent.

The total prewashed gasoline then flows upward through a countercurrent contact tower; in the lower section of this tower the gasoline is contacted with caustic methanol for mercaptan removal and in the upper section the gasoline is contacted with caustic for methanol recovery. Regenerated caustic is fed to the top of the extractor and recovered methanol to about the middle column. Finally, the treated gasoline is water washed, utilizing water cycling within the unit. The foul caustic methanol from the bottom of the extractors is steam stripped in the regenerator, driving mercaptans, methanol, and water overhead and producing a regenerated caustic bottoms product. The condensed overhead is mixed with additional water and mercaptans are removed as the upper layer of the settled mixture. As noted above, the water methanol lower layer from the mercaptan separator is contacted with a portion of the prewashed gaso-

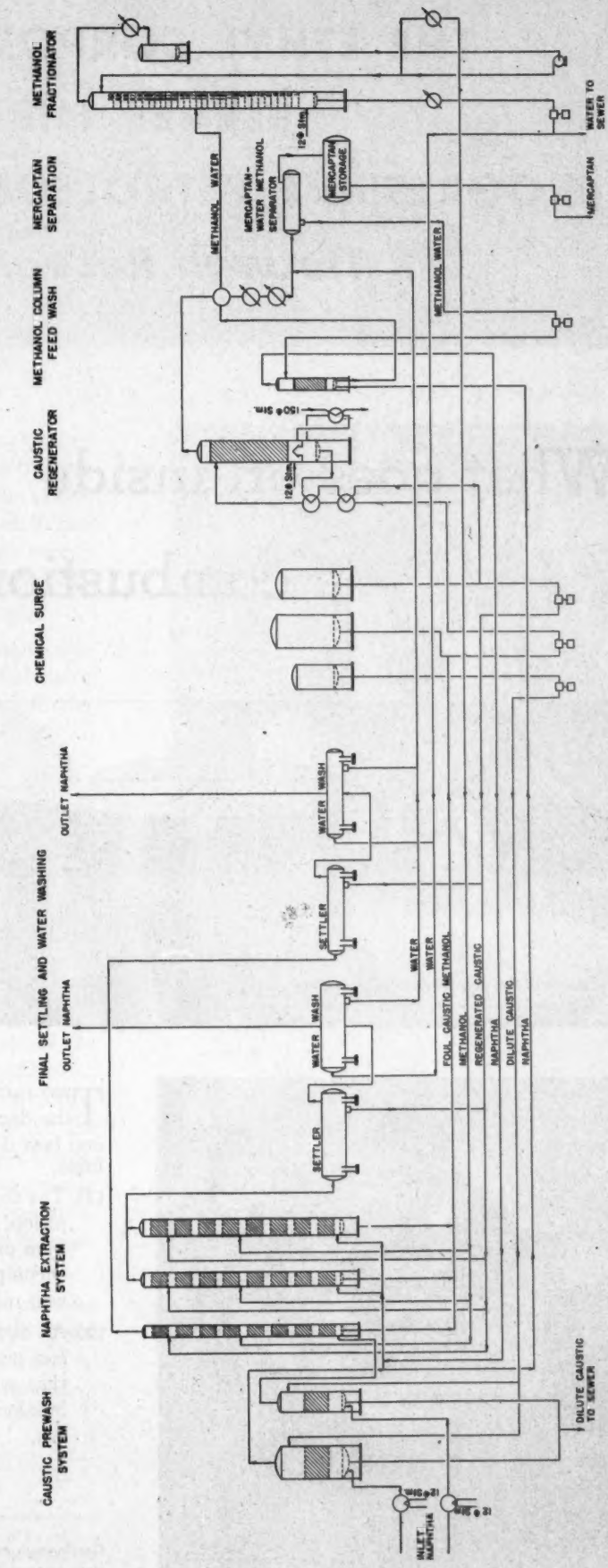
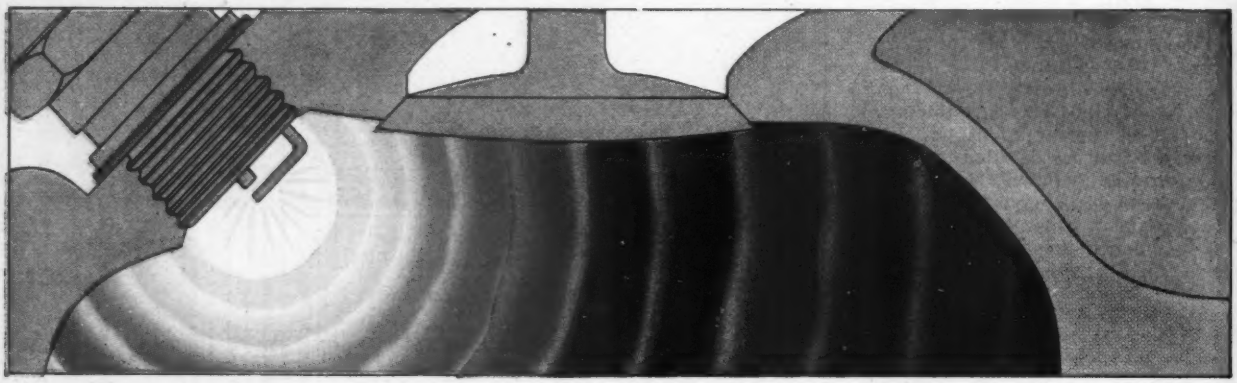


Fig. 1—Schematic arrangement of Atlantic Refining Co.'s Philadelphia Unisol plant

THE ETHYL CORPORATION SERVES THE PROGRESSIVE PETROLEUM INDUSTRY *Through Research*

What goes on inside a combustion chamber?



TWO FACTORS have combined to keep science in the dark on the vital problem of combustion and how it relates to the hydrocarbon structure of fuels.

(1) The entire combustion cycle—compression, ignition, flame travel and power stroke—may take place in only 1/60 of a second and often encompasses action at supersonic speed that well-nigh defies photographing!

(2) All hydrocarbons burn to practically identical end-products—water and carbon oxides—so that we cannot determine much about combustion from an examination of engine exhaust gas.

Oscillograph and associated equipment are used to study pressure rise during different types of combustion.

Notwithstanding these obstacles, combustion research by manufacturers of engines and by suppliers of fuels and additives has never slackened. More knowledge is essential if the advance in fuel and engines is to continue and maximum energy is to be realized from each gallon of precious gasoline.

What are the approaches to this problem?

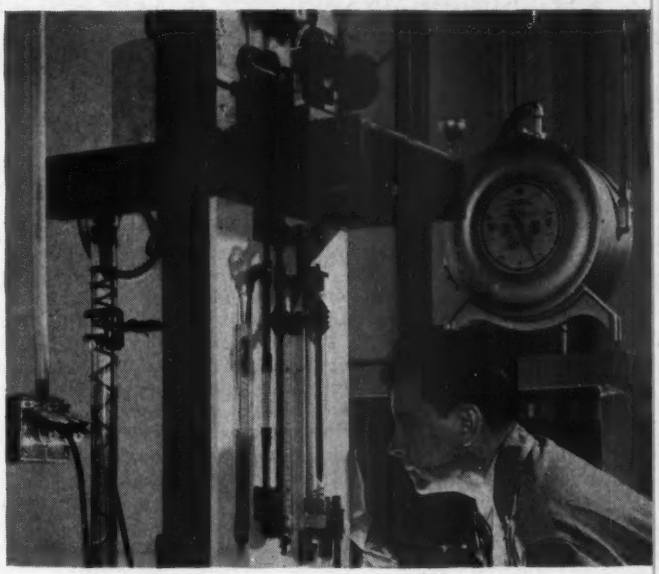
In the Ethyl Research Laboratories, many avenues have been explored. When full-scale engine studies proved impracticable, special single-cylinder engines with unusual instruments were developed for better control and observation. Engines of high volumetric efficiency (for attaining up to 760 IMEP) and high compression ratio (17.5 to 1), and equipment for delicate measurement of heat flow and for exact determination of preignition, wild ping and knock, were developed by Ethyl research engineers.

Looking Forward

But Ethyl's work has not been confined to engines. Pioneer study in slow oxidation and spontaneous ignition proved that events ahead of the flame are responsible for the phenomenon of knock, and helped to explain the difference in knocking tendency between different hydrocarbons and the mechanism by which tetraethyllead stops knock. Still looking forward, Ethyl now is investigating ignition, flame propagation and combustion products of fuels and additives in a variety of burners, from small glass tubes to jet engine combustors.

All this work has been directed toward relating the hydrocarbon structure of fuels and the effects of fuel additives—not only to knock but also to other aspects of fuel performance, such as ease of ignition and cleanliness of burning.

This is the sixth message in a series. Future messages will cover other phases of the complex problem faced by refiners in providing gasoline for today's and tomorrow's engines and the contributions of the Ethyl Corporation to their solution.



This equipment for control of fuel and air flow to a flame tube is used in basic study on products of combustion.

Basic research on combustion is carried on by the Research Laboratories of the Ethyl Corporation as a part of a never-ending program to improve the composition and usefulness of "Ethyl" brand of antiknock compound, and as a service to oil companies in the development of better petroleum products capable of economical production.

ETHYL CORPORATION

RESEARCH LABORATORIES

1600 WEST EIGHT MILE ROAD, DETROIT, MICHIGAN

2600 CAJON ROAD, SAN BERNARDINO, CALIFORNIA

line before being charged to the methanol fractionator; the methanol fractionator produces recovered methanol overhead and a water bottoms product which is used for water washing treated gasoline and diluting the caustic regenerator overhead.

Reference to the photograph and the following brief description of major equipment items will give a better conception of the plant:

Three extractor towers are employed, of 3½, 4, and 5-ft. diameter, respectively, each being 62.5 ft. high and packed with eight sections of ½ in. carbon raschig rings. The caustic regenerator is a 6-by-47-ft. nickel-clad tower packed with 2 in. carbon rings and the methanol fractionator is a 5-by-68-ft. tower with 30 bubble trays. This latter tower is approximately twice the size required, to permit future expansion of the plant.

Other than the regenerator tower itself, monel corrosion protection is employed in the regenerator reboiler and its associated piping and in the two caustic exchangers. All other equipment is of conventional construction. A word of explanation on the method of heating the caustic regenerator is in order; the heat required to raise the caustic from preheat temperature to the boiling temperature of strong caustic, and to evaporate the methanol can be supplied by external steam through an alloy reboiler or it can be supplied by the direct use of superheated steam. The choice will depend on fuel cost and equipment cost for any specific installation.

Process Results

A recent paper by K. M. Brown[1] summarized numerous Unisol plant operating results. It is now possible to expand these data on the basis of the first year's operation of the Atlantic unit. During this period five different types of stocks have been processed; a mixture of low-sulfur reformed and visbreaker gasoline; a higher-sulfur mixture of the same type; a high-sulfur thermally cracked polymer mix; a West Texas straight-run gasoline, and finally a high-vapor-pressure low-end-point stream.

Data for treating these stocks with an average of 3.0 per cent caustic-1.5 per cent methanol are summarized in Table 1. These data were carefully obtained during test-run periods; the octane data for example are averages of a number of samples comparatively rated. Examination of these data shows that in all cases the product contains 0.001 or lower weight per cent mercaptan sulfur (potentiometric method). Although the products are not "doctor sweet" as they leave the unit, they consistently become doctor sweet in the course of being blended to motor fuel-product. The production of doctor-sweet motor fuels, employing Unisol-treated product in up to 50 per cent concentration, in the final blend, has been an accomplished fact in plant operations for over 9 months.

During the early Unisol-plant operation, it was demonstrated in the laboratory that with a methanol-water wash, the resulting mercaptan concentration would sweeten in normal storage. When inhibitor is required to maintain stability, the use of a phenylenediamine-type inhibitor will permit the sweetening reaction to proceed. U.O.P. No. 5 inhibitor has been employed directly at the Unisol plant outlet since July 1947 and, as stated above, the final blend has been consistently doctor sweet.

With the completeness of mercaptan extraction obtained by the Unisol process, the only significance of the doctor test is in terms of odor control. In this respect the doctor test is a poor substitute for the human nose; for example, Henderson, Agruss, and Ayres[2] have shown that the doctor test will tolerate 0.0006 per cent of highly odiferous ethyl mercaptan and only 0.0002 per cent of less-objectionable higher-boiling mercaptans. Recognizing the shortcomings of the doctor test, Atlantic has attacked the odor problem by setting up a group of six individuals to rate the odor quality of gasoline by blindfold testing. This group has demonstrated its ability to evaluate accurately concentrations of mercaptan beyond the power of a simple doctor test. The group has been operating for more than a year. On the basis of this work it can be stated that Unisol-treated gasoline not only passes the doctor test but its odor quality is at least the equal of other gasolines marketed on the Eastern Seaboard.

In examining the octane data in Table 1, it will be noted that the octane drop associated with all oxidation treating methods does not occur in the Unisol process and further that significant improvements in tetraethyl lead susceptibility are obtained. In evaluating octane data, all stocks present in a given blend must be taken into account; for this purpose the authors have found the work of Ryan[3] to be most useful.

Two of the above stocks, the "Z-gas naphtha" and the West Texas straight run, are not normally charged to the Unisol plant; data on these stocks were obtained during periods of low production of normal Unisol charge. The Z-gas naphtha is normally caustic washed, acid treated, doctor sweetened, and rerun and the West Texas straight run is normally catalytically desulfurized and doctor sweetened. The investment and operating costs for Unisol processing are appreciably less than for existing processing methods for both of these stocks.

Table 2 presents the complete ranges of mercaptan sulfur contents thus far experienced for plant operation on a variety of stocks.

Treating vs. Inhibiting

For many years the reformed-visbreaker gasoline mixture has been vapor phase Gray treated for stability; following the Gray treating, this stock was given a two-stage caustic wash and the residual mercaptan doctor sweetened. Numerous attempts were made to substitute inhibitors for Gray treating but it was never possible to make a product of fully satisfactory stability. With the Unisol plant operating on this stock, the Gray towers were bypassed and a very satisfactory product produced with a small quantity of U.O.P. No. 5 inhibitor—refer to Table 3.

The superior stability of the Unisol product is ascribed to two factors: no oxidation of sulfur or hydrocarbon compounds takes place, and a portion of the "natural inhibitor" is removed; this ability to remove or to control the concentration of acid oils, or naturally occurring cresols, permits the full utilization of synthetic inhibitors.

TABLE 2—UNISOL PLANT RANGE OF MERCAPTAN REMOVAL FROM VARIOUS NAPHTHAS WT. PER CENT S AS RSH

	Wt. per cent S as RSH	
	Inlet	Outlet
Gray tower motor stock, high sulfur	.1008-.0336	.0017-.00057
Gray tower motor stock, low sulfur	.0247-.0123	.091-.00002
West Texas Permian straight-run naphtha	.107-.0787	.001-.0005
Z-gas naphtha	.133-.0533	.0017-.0006
Stabilite	.370-.0427	.0008- Nil

TABLE 3—ELIMINATION OF GRAY VAPOR-PHASE TREATING OF THERMAL REFORMED-VISBREAKER STREAM GASOLINE QUALITY

	With Gray vapor-phase treatment		Elimination of Gray vapor-phase treatment and substitution of inhibitor	
	Regular gasoline*	Premium gasoline*	Regular gasoline*	Premium gasoline*
Wt. per cent U.O.P. No. 5 inhibitor	0.0003	0.0003	0.00075	0.00075
Copper dish gum, mg.	4	7	3	6
A.S.T.M. gum, mg.	0.6	1.0	0.4	0.7
Induction period, minutes	495	675	510	600

*Gasoline contains 30 per cent thermal reformer-visbreaker stream

TABLE 4—ACTUAL UTILITIES YEAR 1947

Steam 150-lb. live M lb./1,000 bbl. gasoline	9.0
12-lb. exhaust M lb./1,000 bbl. gasoline	26.0
Power* kwh./1,000 bbl. gasoline	108
Cooling water† M gal./1,000 bbl. gasoline	29.0
Caustic prewash lb./1,000 bbl. gasoline	20
Caustic process lb./1,000 bbl. gasoline	74
Methanol gal./1,000 bbl. gasoline	11

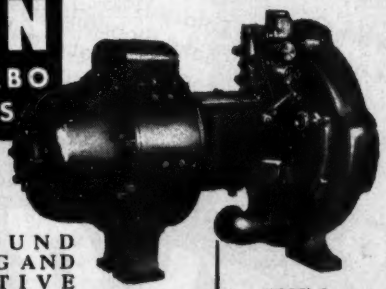
*Includes total of cooling tower operations, pumping, power, etc.
†Makeup water.

You can do *yourself* a world of good on October 14th*

**Oil Progress Day*

NOW IS THE TIME TO PREPARE!

MOON STEAM-TURBO GENERATORS



MODEL 8

IMPORTANT FEATURES:

- COMPOUND WINDING AND SENSITIVE GOVERNOR on steam driven models maintain steady voltage from No load to Full load.
- NEW AUTOMATIC SIGHT-FEED OILERS.
- AUTOMATIC OVERSPEED CUT-OFF VALVE prevents any possible overspeed damage to generator.

a rugged, dependable, economical plant

FOR LIGHT & POWER

Models from 1 to 7½ KW Capacity . . . Write today for illustrated circulars!

- Prompt service on Rebuilding your old Moon Generators — Send them in now.

Moon MANUFACTURING CO.

ESTABLISHED 1893

116 NORTH JEFFERSON ST., CHICAGO, ILLINOIS, U. S. A.

NEW HOME OF ASHCROFT GAUGES, STRATFORD, CONN.

A name you can trust

ASHCROFT Gauges have merited the trust of American Industry since 1851 when Geo. H. Ashcroft built the first Bourdon Tube Gauge ever to be manufactured in the United States.

Over the years, since 1851, the ASHCROFT name has become a symbol of dependability wherever gauges are used. An ASHCROFT specification today is your assurance of—

- Unmatched engineering and research facilities—the accumulated "know how" of a century.
- The newest, best equipped gauge manufacturing plant in the world at Stratford, Connecticut.
- A *complete* line—a gauge for every purpose.
- Stocks available in every marketing area in the U. S. and Canada.
- 60 Factory trained field engineers to serve you.
- More ASHCROFT gauges in service than any other make.

Specify ASHCROFT—a name you can trust.

Stocked and sold by leading Distributors everywhere . . . When you order gauges, insist on ASHCROFT.

1850 ASHCROFT U.S.A.

MAXWELL MANNING M&M & MOORE INC. TRADE MARK

ASHCROFT *Gauges*

A Product of

MANNING, MAXWELL & MOORE, INC.

STRATFORD, CONNECTICUT

Makers of Ashcroft Gauges, Hancock Valves, Consolidated Safety and Relief Valves and 'American' Industrial Instruments. Builders of 'Shaw-Box' Cranes, 'Budgit' and 'Load Lifter' Hoists and other lifting specialties.

WHAT DO YOU WANT IN A ROTARY HOSE?

Do you want long life?
Goodall Flexo Rotary Hose lasts longer. Because of its greater flexibility, sharp bends don't damage it and normal whipping from mud pump surge does not cause excessive wear.

Do you want greater strength?
Goodall Flexo Rotary Hose is the strongest hose built and it retains its higher strength longer than any other hose.

Do you want easier handling?
Goodall Flexo Rotary Hose is easy to handle because it is extremely flexible and light in weight. You can loop it into a compact, manageable-sized coil and transport it without a loading rack because bending or coiling can't hurt it. The only necessary precaution is to protect it from being cut or crushed by heavy equipment.

Goodall Repair Service
Goodall maintains a repair department in Houston, Texas, and is the only rotary hose manufacturer to offer a complete repair service. This service, combined with the advanced features of Goodall Flexo Rotary Hose and Barney Couplings make Goodall the favorite with oil companies and drilling contractors everywhere.

GOODALL
FLEXO
LONG LIFE Rotary Hose

BARNEY COUPLINGS — the only couplings stronger than the hose — are standard on Goodall Flexo Rotary Hose.

Stocked at all distribution points

GOODALL RUBBER COMPANY OF TEXAS
1606 MAURY STREET HOUSTON, TEXAS

DISTRIBUTORS: Texas and Louisiana—Houston Oil Field Material Co.—Wilson Supply Co. Oklahoma—Iverson Supply Company.
GOODALL RUBBER COMPANY OF CALIFORNIA: San Francisco, Los Angeles, Seattle, Salt Lake City.
EXPORT: Goodall Rubber Company, Trenton, N. J.
FACTORY AT TRENTON, NEW JERSEY.

For a review of inhibitor application refer to C. D. Lowry[10]. The ability to eliminate the treating mentioned has permitted an appreciable saving in gasoline yield, octane quality, and operating cost.

Utility and Chemical Consumption

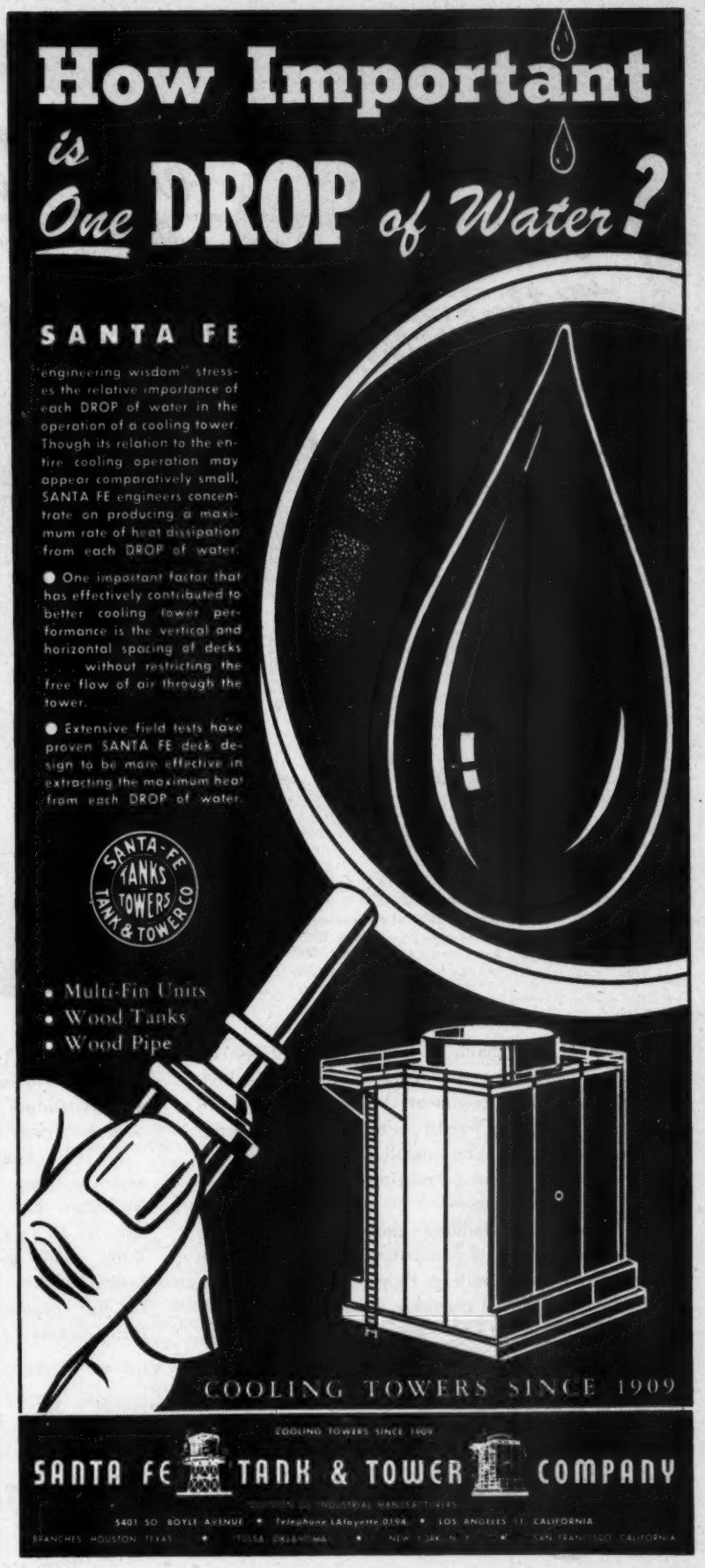
Utility and chemical consumption data for 1947 are summarized in Table 4. These data cover the period of "growing pains' 'on the unit and represent an average of about 4 per cent caustic and 2 per cent methanol treat; as such, they are subject to considerable improvement, in fact current operation shows significant improvement. More detailed comments are: Steam-consumption data for current operation at 3 per cent caustic and lower stripping steam rates are 6.7 lb. of live steam per barrel and 15.4 lb. of exhaust steam per barrel of gasoline treated; prewash caustic consumption is a function of hydrogen sulfide content in the Unisol feed which is quite high in the feed to the Atlantic unit.

Methanol consumption is too high and this is due to an oversight in not including a sump system for recovering sample flushings, occasional pump gland leakage, etc. The accounted-for methanol in gasoline runs 3 to 5 gal. per 1,000 bbl. and the accounted-for loss to water runs 0.5 to 1.0 gal. per 1,000 bbl. A sump system is being installed and it is expected that the methanol consumption will then approach the sum of the above two figures; in the meantime the figure of 5 gal. per 1,000 bbl. for other units with longer operating experience is more reasonable.

Due to the essentially new condition of the equipment, very little discussion of maintenance is possible, except to state that no unusual corrosion or maintenance problem has developed. When this unit was designed it was tentatively decided that it should be shut down every 6 months for safety inspection and mechanical overhaul. This 6-month schedule has been followed and based on present experience appears reasonable.

Literature Cited

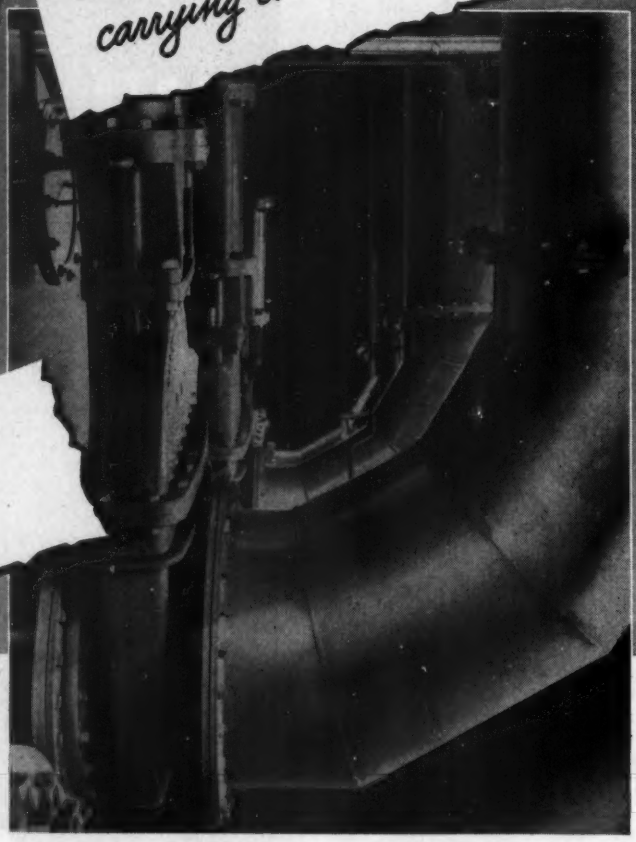
1. Schulze, W. A., Buell, A. E., National Petroleum News 27, No. 41, 25 (1935).
2. Field, H. W., The Oil and Gas Journal 40, No. 20, 40 (1941).
3. Mason, C. F., Bent, R. D., McCullough, J. H., The Oil and Gas Journal 40, No. 26, 114 (1941).
4. Fowle, M. J., Field, H. W., World Petroleum 13, No. 2, 44 (1942).
5. Lowry, Jr., C. D., Moriarty, F. C., The Oil and Gas Journal, No. 105, (1945).
6. Moriarty, F. C., The Oil and Gas Journal, 42, No. 47. 82 (1944).
7. Brown, K. M., World Petroleum 18, No. 7, 72 (1947).
8. Henderson, L. M., Agruss, M. S., and Ayers, G. W., Jr., Ind. Eng. Chem. (Anal. Ed.), 12, No. 1, 1-4 (1940).
9. Ryan, J. G., Ind. & Eng. Chem. 34, 824 (1942).
10. Lowry, Jr., C. D., The Oil and Gas Journal 46, No. 48, 211 (1948).


How Important
is
One DROP of Water?
SANTA FE
"engineering wisdom" stresses the relative importance of each DROP of water in the operation of a cooling tower. Though its relation to the entire cooling operation may appear comparatively small, SANTA FE engineers concentrate on producing a maximum rate of heat dissipation from each DROP of water.
● One important factor that has effectively contributed to better cooling tower performance is the vertical and horizontal spacing of decks . . . without restricting the free flow of air through the tower.
● Extensive field tests have proven SANTA FE deck design to be more effective in extracting the maximum heat from each DROP of water.
SANTA FE TANKS TOWERS TANK & TOWER CO
• Multi-Fin Units
• Wood Tanks
• Wood Pipe
COOLING TOWERS SINCE 1909
COOLING TOWERS SINCE 1909
SANTA FE TANK & TOWER COMPANY
5401 SO. BOYLE AVENUE • Telephone LAfayette 0194 • LOS ANGELES 11, CALIFORNIA
BRANCHES HOUSTON, TEXAS • TULSA, OKLAHOMA • NEW YORK, N. Y. • SAN FRANCISCO, CALIFORNIA

"Installed high in the air, the lighter weight of clad steel pipe means big savings"

"We've standardized on stainless-clad for all ducts carrying corrosive vapors"

"Acid-laden gases at 700° ... clad steel pipe"



These 38" stainless-clad ducts are in a plant built by American Solvent Recovery Corp., Columbus, O.

Users of pipe made of Lukens Clad Steels cite these reasons for their choice: It provides high resistance to corrosion at the lower cost of clad steel. Its lighter weight (compared to cast iron) makes handling and installation easier, cutting erection costs and permitting the use of lighter supporting structures.

Choose the cladding—nickel, stainless steel, Inconel or Monel—according to the corrosive gases you are handling. Piping 18 inches and up is being produced regularly from Lukens Nickel-Clad, Stainless-Clad, Inconel-Clad and Monel-Clad Steels to provide economical protection for refineries, chemical plants and other processing work. Cladding 10% or 20% of total plate thickness suits most applications.

Ask your fabricator to quote on piping, ducts and gas lines made of Lukens Clad Steels. Bulletins 255 and 338 give data on all types of clad steels. We'll gladly send you copies. Lukens Steel Company, 455 Lukens Building, Coatesville, Pennsylvania.

CLAD METAL STEEL

Visit us at the Shows!

Booths 9 and 10
The National Chemical Exposition
Chicago Coliseum
October 12 thru 16

☆

Booth 320
National Metal Exposition
Convention Hall, Philadelphia
October 25 thru 29

LUKENS
Nickel-Clad Stainless-Clad
Inconel-Clad Monel-Clad
STEELS

SOLID METAL ADVANTAGES WITH CLAD STEEL ECONOMY

• • SPEED SCRAP TO THE MILLS TO MAKE MORE STEEL • •

PROGRESS IN METALS

by W. L. Nelson
Consulting Engineer

Corrosion-Resistant Clad Steels

CORROSION-RESISTANT steels are generally too expensive for use in petroleum refining operations but clad steels fall within a price range that is proving practical for many applications. Of course, linings may be attached to existing vessels, but the cost of the labor of attaching a lining is large, and hence clad steels are preferred.

The backing plate may be any carbon or low-alloy steel of standard plate specification such as the following:

Steel—	A.S.T.M.	Tensile strength, psi.	Some elements, %
Carbon	A-285	55,000-65,000	0.3 carbon
Carbon silicon	A-201	60,000-70,000	0.27 carbon, 0.15-0.3 Si
Carbon silicon	A-212	70,000-82,000	0.33 carbon, 0.15-0.3 Si
Nickel	A-203	70,000-82,000	2.0-2.75 Ni
Molybdenum	A-204	70,000-82,000	0.4-0.6 Mo
Vanadium	A-225	75,000-87,000	0.08-0.14 Va

Lukens Steel Co. was probably the first (1930) company to produce clad steel. It regularly employs the cladding steels shown in Table 1, as well as the following cladding materials: Nickel, L Nickel (0.02 per cent carbon max.), Inconel (78 per cent Ni, 14 per cent Cr., 6 per cent Fe), and Monel metal (67 per cent Ni, 30 per cent Cu).

The chromium-nickel types are most widely used in petroleum refineries. Type 304, due to the limitation in carbon content, is less susceptible to carbide precipitation during welding than Types 301 and 302 (which allow carbon between 0.08 and 0.20) and may be used over a wider range of corrosive conditions without subsequent heat treatment. Type 304 may be had with only 0.03 per cent carbon.

Type 316 is somewhat more corrosion resistant than Type 304 because of the addition of 2-3 per cent of molybdenum. It is particularly resistant to naphthenic acids and to other organic acids.

Type 347 contains columbium to prevent the precipitation of harmful carbides. This material should be used for welded vessels if the service temperature ranges from 800° to 1,600° F., if a weldment is to be stress relieved, or if certain corrosive conditions are encountered.

Machinability of High-Phosphorus Gray Cast Iron

IT is well known that high-phosphorus gray-iron castings have poor machinability. This is particularly true whenever high-prosphorus castings are machined at high cutting speeds.

The results of an investigation showed that definite improvement can be obtained by desulfurization of the base iron, with and without alloy additions. The base iron had the following composition: 3.54 carbon, 2.56 silicon, 0.69 manganese, 0.069 sulfur, and 0.65 per cent phosphorus. It was found that desulfurization **alone** would produce appreciable improvement in the machinability rating of the base iron (i.e., an increase of 24 per cent over that of the untreated iron).

Significant improvement can be attained by a combined treatment involving sodium carbonate desulfurization followed by zirconium alloy addition. Specific conditions arising from the resulting low sulfur content and the zirconium addition give rise to an improvement of 40 to 50 per cent in the machinability of the base iron with but little alteration of its composition other than sulfur. This treatment is believed to be commercially practicable and can be carried out at an estimated cost of less than $2.50 per ton of treated iron.

An abstract of "Improvement of Machinability in High-Phosphorus Gray Cast Iron" by W. W. Austin, Jr., presented before the May 3-7, 1948, annual meeting of the American Foundrymen's Association (Preprint No. 48-21), taken from the June issue of Materials and Methods.

TABLE 1— STAINLESS CLADDING STEELS (LUKENS STEEL CO.)

Grade—	A.I.S.I. type and composition (per cent)* Type	C (max.)	Cr	Ni	Mn (max.)	Others
Chromium-nickel	304	0.08	18-20	8-11	2.0	
	316	0.10	16-18	10-14	2.0	1.75-2.75 Mo.
	347	0.10	17-19	9-12	2.0	Cb-10 times min. C.
Straight chromium	410	0.15	11.5-13.5	....	1.0	
	430	0.12	14-18	....	1.0	

*Phosphorus 0.04 max., sulfur 0.03 max., and silicon 1.0 max.

Hard Surfacing by Fusion Welding

THE 100-page book of this same title by Howard S. Avery, is one of the most comprehensive and yet concise statements on hard surfacing that has been published. It is the first of a series of monographs on wear, being published by American Brake Shoe Co., New York, 1947.

It contains many excellent photomicrographs and although it introduces theory, it manages to maintain the practical approach. The scope of the book is indicated by the following chapter titles:

1. Economic Advantages of Hard Surfacing.
2. Hardness.
3. Abrasion and Impact.
4. Abrasion Testing.
5. Galling.
6. Materials for Hard Surfacing.
7. Metallic Carbides.
8. Cobalt-base alloys.
9. Nickel-base alloys.
10. Iron-base alloys.
11. Austenitic steels.
12. Pearlitic steels.
13. Martensitic steels.
14. Cast irons.
15. Welding technique.
16. Composites.
17. Applications.

Selected bibliography.

Although the oil industry and its applications are not directly mentioned at many points in the book, the general subject of hardness and abrasion resistance is vital to the oil industry, particularly in the drilling of wells and in the handling of abrasive-laden fluids. Over 30 applications of hard surfacing in the petroleum industry are listed and in addition over 45 closely related applications are mentioned.

The property known as "hardness" and its relationship to wear, abrasion, impact, friction, galling, etc., is elusive. Few discussions contribute a clear picture of the situation, and hence, this authoritative discussion is welcome and appreciated.

Forging Terms or Operations

FORGING

The operations of working a metal or alloy while in the plastic stage or state. In most forge shops it is also necessary to practice certain **cold-working** operations as well as the **hot-working** operations of forging.

Compare performance of....

CORING WITH DIAMONDS

IN THE WEBER SANDSTONE AT RANGELY

COMPARATIVE CORE RECORDS*

	DIAMOND HEAD	CONVENTIONAL BARREL AND BITS
Weber section cored (ft.)	485	433
Core recovery (ft.)	484.36	398.08
Core recovery (%)	99.89	91.93
Number cores cut	22	57
Average cut per core (ft.)	23.81	7.59
Total cutting time (hr.)	98.84	614.1
Total reaming time (hr.)	0	166.62
Total trip time (hr.)	143.9	675
Core time per foot (min.)	11.97	110.31
Number core bits	4	57
Avg. cut per head (ft.)	115.3	7.59

*Diamond-bit Coring, Neil Williams, *Oil & Gas Journal*, 1/4/47

THE WEBER IS TOUGH. The Weber sandstone at Rangely field in Colorado presented so many problems that until diamond coring was attempted, very little was known of the reservoir. The formation "is a thick section of very hard, fine-grained, tight sand interbedded with hard shale and lime and containing micaceous and arkosic depositions with a secondary cementation of calcite and silica."*

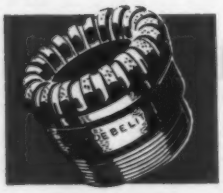
FOR BEST RESULTS, USE THIS MAGIC COMBINATION

KOEBELITE

DIAMOND INSERT CORE BITS

BLACK MAGIC

OIL BASE DRILLING FLUID



KOEBELITE CORING

reduces hours to minutes

Operators using Koebelite diamond core bits in the Weber made 11 cores in two wells for a total of 549 feet. Recovery was 100%. Core time averaged from 6.7 to 13.6 minutes per foot, where formerly footage had been computed in hours. Total diamond cost of the 549 feet was only $764.15 or $1.40 per foot.** Diamond coring programs required 6 to 8 days or one-sixth the time of conventional methods. Worn inserts can be replaced on Koebelite bits and many have cored over one thousand feet in the worst abrasive sands ever encountered.

**Drilling with Diamonds, H. C. Arnold, *Oil Reporter*, 4/20/48.

BLACK MAGIC

makes diamond coring possible

Because Black Magic oil base drilling fluid is not adversely affected by the reduced circulating rates required by diamond coring, it is now adopted as the standard medium in diamond coring programs. Mud conditioning is no longer necessary. Black Magic keeps a hole to gauge, another prime factor in successful diamond coring. It has a filtrate loss of zero in one hour on the API tester and will not damage or water block the producing section. Lubricating qualities of Black Magic save equipment, prevent fluid erosion on the matrix of Koebelite bits and prevent jamming of core barrels.

Coring the Weber by conventional means averaged 40 to 50 days. Conventional core bits were used up at an alarming rate. Time for coring one foot often ran over two hours. Frequent round trips slowed the program. Reaming was necessary. Costs were prohibitive. Something better was needed. Results of coring with diamonds have been tabulated in the above chart. Since then, many improvements have been added.

For complete information on coring with diamonds contact your nearest Oil Base, Inc., office or write the main office. Export representatives: Petro-Tech Service Company, Maracaibo, Venezuela; G. Saavedra E Hijos, S. de R. L., Mexico City, Mexico.

☆ ☆ ☆

OIL BASE, INC.

Main Office: 130 Oris Street, Compton, Calif.
BRANCHES: Bakersfield, Long Beach, Ventura, CALIF.; Houston 2, Midland, TEXAS; Oklahoma City 2, OKLA.; Vernal, UTAH.

DISTRIBUTORS FOR KOEBELITE DIAMOND BITS

ENGINEERING Fundamentals

Theoretical Productivity Index

THE term productivity index has been defined as the barrels per day of stock-tank oil production per pound pressure drop between the flowing sand face pressure and the static reservoir pressure. An expression for this quantity can be worked out on a theoretical basis using the steady state formula as developed for a radial system flowing oil and gas. By such an approach, it can be shown that productivity index for a given well system can be expressed in terms of three parameters, (1) the producing gas-oil ratio, (2) the absolute reservoir pressure, and (3) the pressure gradient in the well system. The original development of this idea is due to Muskat and Evinger.[1]

For the steady state flow of oil and gas in a radial system, the following equation expresses the rate of oil flow (Engineering Fundamentals No. 343):

$$Q_o = \frac{7.07\ kh}{\ln R_e/R_w} \int_{P_w}^{P_e} \frac{k_o/k}{\mu_o \beta}\, dp \quad (1)$$

The integral is evaluated as shown in Fig. 1 by finding the area under a plot of $\frac{k_o/k}{\mu_o \beta}$ versus pressure between the limits P_e and P_w. Now, if the term Q_o is divided by the pressure drop $(P_e - P_w)$, then a quantity equivalent to the productivity index is obtained. In other words:

$$\text{P.I.} = \frac{Q_o}{(P_e - P_w)}$$

$$= \frac{7.07\ kh.\ (\text{area under curve})}{\ln R_e/R_w\ (P_e - P_w)} \quad (2)$$

It is well to inspect this result to determine what factors are important. In the first place, it will be noted that P.I. from Equation 2 will not double if $(P_e - P_w)$ is doubled because the area under the curve will not double. Second, it will be noted that of $(P_e - P_w)$ equal to a definite value be taken at a high absolute pressure, the area will be greater than if taken at a lower absolute pressure. All other things being constant, therefore, the P.I. value will be greater at higher reservoir pressures and low drawdowns.

The third thing to note is that the P.I. value will depend on the producing gas-oil ratio, R. This is not readily apparent unless one remembers how the relationship drawn in Fig. 1 was obtained. It is a result of steady state flow of an oil and gas mixture. To define such steady flow the ratio of oil flowing to gas flowing must be stated. Therefore, each value of R means a different steady state system for which a different curve will apply. Fig. 2 demonstrates how the function changes, with R values on a given well system.

Hence, the comparison of P.I. values on two well systems must not only include permeability, sand thickness, well radius, drainage radius, fluid characteristics, and flow relationships. A comparison must also be made on the basis of equal reservoir pressures, equal pressure drawdowns, and equal gas-oil ratios. Using the curve of Fig. 1, the variation shown in Fig. 3 has been prepared. This demonstrates the dependence of P.I. on reservoir pressure and pressure drawdown for one gas-oil ratio only. A similar figure would be necessary for each and every gas-oil ratio chosen. These curves will vary, of course, depending on the physical characteristics of the reservoir fluid (μ_o/μ_g, β, v, and r) but the general variation is as indicated by the diagrams.

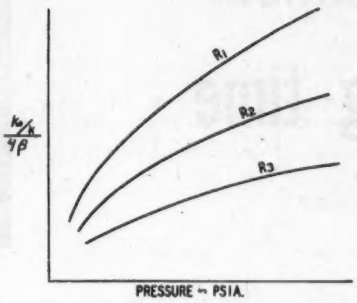


Fig. 2—Change of function $\frac{k_o/k}{\mu_o \beta}$ *for a given well system for various gas-oil ratios* $R_1 < R_2 < R_3$

Reference

1. Evinger and Muskat, Theoretical Productivity Factor, A.I.M.E., 1942 (Vol. 146).

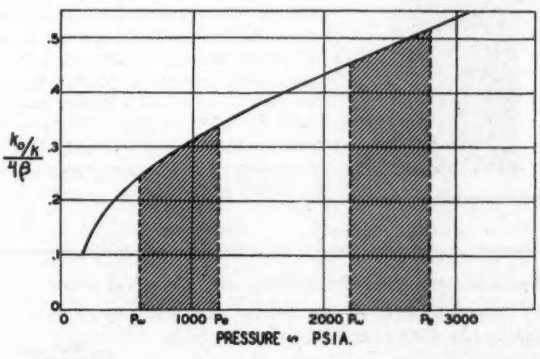


Fig. 1—Plot of function to obtain $\int_{P_w}^{P_e} \frac{k_o/k}{\mu_o \beta}\, dp$

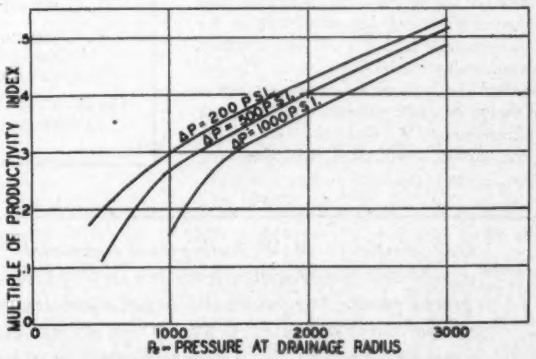
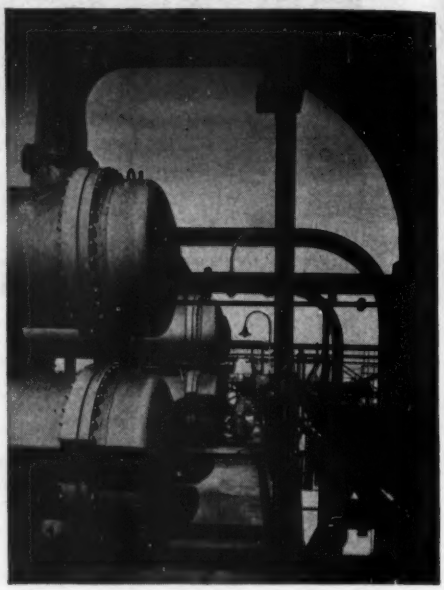


Fig. 3—Variation of P. I. on a steady-state system with gas-oil ratio constant

Series by Dr. John C. Calhoun, Jr., Chairman, Petroleum Engineering School, University of Oklahoma

NUMBER 3 IN A SERIES

The "Master" Contract and mechanical engineering time



THE "master" type of contract for refinery modernization and expansion—under which one engineering company takes complete responsibility for all work—nowhere manifests its superiority to greater advantage than in the time-consuming details of mechanical engineering.

First, through confining all engineering within *one* organization it eliminates costly hours spent in coordinating details between several engineering contractors. Further the "master" contract operation eliminates any possibility of expensive job-site alterations when a few of the multitudinous details involved fail to be accurately coordinated among several engineering organizations all working independently.

To get down to a few specifics in the matter of savings through coordination, the "master" contract operation saves time *at the very inception of mechanical engineering*—in the initial problems concerned with the relative locations of the process units, their space and tankage requirements and such provision for future expansion as may be deemed necessary without undue initial investment. The required off-site facilities are usually an important factor in these problems and therefore simultaneous studies must be made of the electric power, steam, fuel gas, water and air distribution systems, all yard oil piping and the various sewers and blowdown systems, before an intelligent decision can be made.

Detailed design of the process units cannot be started until this overall picture has been completed, steam, water and fuel gas pressures and temperatures at the battery limits have been determined, where all incoming and outgoing services and oil and sewer lines should enter and leave each battery limit and their elevations.

All these as well as a veritable host of other important engineering details *must be* integrated between units—not on the basis of greatest ease or economy in the building of any one unit—but on the basis of *overall economy and efficiency of the entire processing plant.*

To obtain such integration to the maximum degree of final efficiency among the various design departments of several engineer-contractors is obviously expecting the impossible from human nature. For it must be borne in mind that each engineer-contractor has developed his organization along lines that suit his particular method of operation. Each has his own particular methods and standards of design, each his own table of specifications. If the impossible is accomplished, it is *still* costly—for since each contractor must wait for information from the other there is time consumed in its accomplishment that could serve either to advance the date of operation of the unit, or lower its cost, or both.

by
O. G. PRATT
In Charge of Mechanical Engineering
The M. W. Kellogg Company

There is still another major overall advantage of the "master" contract operation—beyond the actual dollars-and-cents savings in engineering time. This is in the *uniformity of engineering specifications*—when all work at the job site is handled by *one concern.* Such uniformity results in reduced construction costs since all buildings and structures will be of uniform basic design. Furthermore, such uniformity results in reduced maintenance costs and a smaller spare parts inventory, neither being an inconsequential consideration in these days when maintenance costs are a major factor in establishing processing profits.

Our company—M. W. Kellogg—is completely staffed and equipped for refinery and chemical plant design and construction, from the step of laboratory research through the initial operation of completed plants. It periodically issues a publication called the KELLOGGRAM, which describes many of these services. If you are not already receiving it, we will be glad to add your name to the list if you will drop us a line at 225 Broadway, New York 7, N. Y.

A SUBSIDIARY OF PULLMAN, INC.

NEW YORK JERSEY CITY LOS ANGELES TULSA HOUSTON TORONTO LONDON PARIS

The Refiner's Notebook

A WEEKLY FEATURE OF THE OIL AND GAS JOURNAL

Cost of One Brake-Horsepower

(From files of I. A. Anson, Bell Oil & Gas Co.)

Type of drive	Basic price of fuel, power or steam: Per common unit	Per lb., cents	Per 10^6 B.t.u., dollars	Properties of fuel: A.P.I.	Lb. per gal.	B.t.u. per S.c.f. or lb.	Per brake horsepower-hour (2,545 B.t.u.): Fuel or steam required	B.t.u.	Cost, cents: Fuel	Lube[1]	Total[2]	Efficiency based on heat in basic fuel (%)
GAS ENGINE	20 cts. per M.s.c.f.	[3]0.43 gas	19 cts. gas	....	....	1,050 per S.c.f.	14.3 cu. ft.	[4]15,000	0.29	[26]0.02	0.31	[5]17.0
ELECTRIC MOTOR	1 ct. per kwh.	....	[6]$2.93 elect.	....	....	.....	[7]0.88 Kwh.	[8]3,000	0.88	0.01	0.89	[9]85.0
DIESEL ENGINE	14 cts. per gal.	2.0 oil	[5]$1.02 oil	37	7.0	19,650 per lb.	[11]0.42 lb.	[12]8,250	0.84	[26]0.03	0.87	30.8
GASOLINE ENGINE	14 cts. per gal.	2.3 gaso.	$1.12 oil	60	6.15	20,250 per lb.	[13]0.70 lb.	14,200	1.59	[26]0.04	1.63	17.9
STEAM ENGINE[15]	30 cts. per	0.43 [17]29.7 cts.	....	....	1,050 per S.c.f.	[14]50-lb. steam	[19]79,000	[12]1.5	[26]0.01	1.51	[23]3.2
(Firing gas)	1,000 lb.[16]	gas as steam					(75 cu. ft. gas)[21]					
(Firing fuel oil)	65 cts. per 1,000 lb.[22]	0.74 [20]64.5 cts. oil as steam		7.0	8.5	18,400 per lb.	[14]50-lb. steam (4.4 lb. fuel)[24]	[18]81,500	3.25	[26]0.01	3.28	[24]3.1
(Firing coal)	30 cts. per 1,000 lb.[25]	0.25 coal	29.7 cts. as steam	....	....	14,000 per lb.	50-lb. steam (6 lb. coal)[26]	[18]84,000	1.5	[26]0.01	1.51	2.3
SMALL STEAM PUMPS	30 cts. per	0.43 [17]29.7 cts.	....	....	1,050 per S.c.f.	[14]150-lb. steam	[18]237,000	[12]4.5	[26]0.02	4.52	[21]1.1
(Firing gas)	1,000 lb.[16]	gas as steam					(225 cu. ft. gas)[21]					
(Firing fuel oil)	65 cts. per 1,000 lb.[22]	0.74 [20]64.5 cts. oil as steam		7.0	8.5	18,400 per lb.	[14]150-lb. steam (13.2 lb. fuel)[24]	[18]244,000	9.75	[26]0.02	9.77	[24]1.0

1. A 50 cents per gallon.

2. Not including labor, maintenance, supervision, or interest on investment.

3. Heating value per pound ranges from 22,000-22,600 B.t.u. per lb. for dry refinery and natural gases unless inert gases are present.

4.—GAS-ENGINE FUEL CONSUMPTION*

(B.t.u. per bhp.-hr.)

Load	Four-cycle	Two-cycle
1¼	11,000	15,000
Full	10,000	13,000
¾	11,000	16,000
½	12,500	17,000
¼	17,000	23,000

*7 per cent less for intermittent operation or loading.

5. 2,545 B.t.u. per bhp.-hr. 2,545 × 100 ÷ 15,000 = 17.0.

6. 3,412 B.t.u. per kwh. (10^6 B.t.u. × 0.01 dollar) ÷ 3,412 = $2.93.

7. 746 watts per hp.-hr. Motor efficiency 85 per cent. Thus 0.746 ÷ 0.85 = 0.88 kwh.

8. 3,412 × 0.88 = 3,000 B.t.u.

9. Based on electricity, not fuel used in generating it. 2,545 ÷ 3,000 = 85 per cent.

10. Heating value 19,650 B.t.u. per lb. (10^6 × $0.14) ÷ (7 × 19,650 = $1.02.

11.—DIESEL SPECIFIC FUEL CONSUMPTION

(Pounds per hp.-hr.)

Size hp.	Per cent of load: Full	80	60	50	40	30
50-60	.45	.46	.48	.50	.55	.64
60-70	.44	.45	.47	.49	.53	.62
70-100	.43	.44	.45	.48	.52	.61
100-250	.42	.43	.44	.47	.51	.59
250-500	.41	.42	.43	.45	.50	.58
500-3,000	.40	.41	.42	.44	.49	.57

12. 19,650 × 0.42 = 8,250 B.t.u.

13.—GASOLINE ENGINE FUEL CONSUMPTION

(Pounds per hp.-hr.)

Aircraft	0.42-0.60
Automobile	0.5 -0.60
Truck or bus	0.45-0.62
Tractor	0.46-0.89
Stationary	0.5 -0.9
Marine	0.5 -0.7

14. Pounds of steam per hp.-hr.:

Flywheel, triple expansion condensing	13-16
Duplex flywheel simple condensing, large	40-43
Duplex flywheel simple noncondensing, large	48-50
Duplex flywheel simple noncondensing, small	50-55
Duplex direct-acting compound, noncondensing	55-75
Duplex direct-acting, ordinary	120-200

15. Noncondensing operation.

16. Using 20 cents per M.s.c.f. gas of heating value 1,050. Boiler efficiency of 64 per cent and 1,010 B.t.u. per lb. steam. Thus, 1,000 × 19 ÷ (10^6 × 0.64) = 30 cents.

17. 10^6 × 0.30 ÷ 1,010 = $0.297.

18. 125-psig. steam contains 1,192 B.t.u. per lb. Thus 1,192 × 50 = 59,600 but it only requires about 1,010 to produce a pound of steam, and hence 1,010 × 50 ÷ 0.64 = 79,000.

19. 50 × 30 ÷ 1,000 =1.5.

20.—LUBRICATING-OIL CONSUMPTION

(Gallons per 100 hp.-hr.)

Gas engines	0.02-0.08
Diesel engines	0.03-0.10
Steam engines	0.01-0.03
Steam pumps	0.02-0.05
Gasoline engines, slow	0.05-0.10

21. Gas per hp. = (50 ÷ 1,000) × (30 ÷ 20) × 1,000 = 75. Eff. = 2,545 ÷ (75 × 1,050) = 3.2 per cent.

22. Firing $2.63 per bbl. 7 A.P.I. fuel oil of heating value 18,400 B.t.u. per lb. or 6,560,000 B.t.u. per bbl. Boiler efficiency of 62 per cent and 1,010 B.t.u. per lb. steam. Thus, 1,000 × 1,010 × 2.63 ÷ (100 × 6.56 × 10^6 × 0.62) = 65 cents.

23. 10^6 × 2.63 ÷ (6,560,000 × 62) = 0.645.

24. Pounds fuel oil per hp. = 50 × 1,010 ÷ (1,000 × 18,500 × 0.62) = 4.4. Eff. = 2,545 ÷ (4.4 × 18,500) = 3.1 per cent.

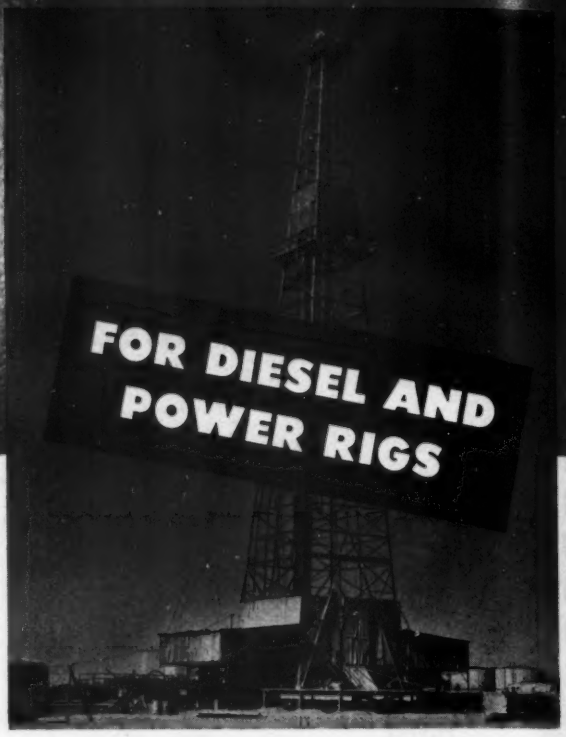
25. Using $5 per ton coal of heating value 14,000 B.t.u. per lb. Boiler efficiency 60 per cent and putting in 1,010 B.t.u. per lb. steam. Thus 1,000 × 29.7 ÷ 10^6 = 30 cts.

26. Pounds coal per hp. = 50 ×1,010 ÷ (1,000 × 14,000 × 0.60) = 6.

No. 213 in a series by W. L. Nelson, professor of petroleum refinery engineering, University of Tulsa

HEAT

FOR DIESEL AND POWER RIGS



Steam! . . . furnished on an instant's notice by a compact, completely automatic Bettis Steamer . . . here's the answer to the problem of heat for power rigs.

Bettis Steamers are handled exactly like your light plant or other auxiliary equipment . . . they can be spotted anywhere by a winch truck or catline; occupy very little floor space; require no attention after they're started.

Any member of the crew can start a Bettis Steamer. It is necessary only to start the engine or motor that drives it, set the pressure controls, open the water and fuel valves . . . *in three minutes time you have all the steam you'll ever require for the coil heater on the floor.* It's so simple . . . and that steam heat will make a world of difference in crew efficiency during the cold winter months ahead.

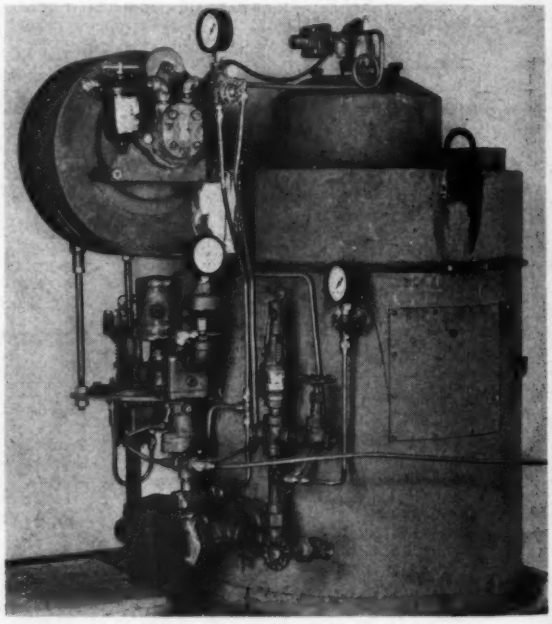
And of course, you'll have steam for other purposes . . . steam for thawing frozen valves and fittings; steam for cleaning rig equipment, for cleaning tool joints and drying off the floor after a trip; steam, even, for a blow barrel that will delight the hearts of your roughnecks and drillers.

Winter is not far off, so don't delay. Equip your rigs with Bettis Steamers and you'll be ready for the coldest days. With the Steamers can be furnished especially designed steam heaters for use on the rig floor, in the dog house or wherever you need heat. Immediate delivery can be made in all sizes.

Full information on Bettis Steamers and steam heaters will be furnished upon request.

(Below) Bettis Steamers are compact and require little floor space. No special foundation or outside insulation is required . . . they may be set anywhere on the rig floor, unitized on a skid with water and fuel tanks or with these tanks placed at any other convenient spot. All Steamers are equipped with lifting eyes to which the catline or winch line may be attached. Experienced Bettis Service Men are available to supervise installation and shop facilities are maintained to mount the Steamer on skid, trailer or truck to specifications. ALL UNITS ARE DESIGNED TO MEET BOILER CODE Specifications.

AVAILABLE FOR QUICK DELIVERY FROM HOUSTON



BETTIS CORPORATION
1507 Maury St. **Preston 9267**
HOUSTON, TEXAS

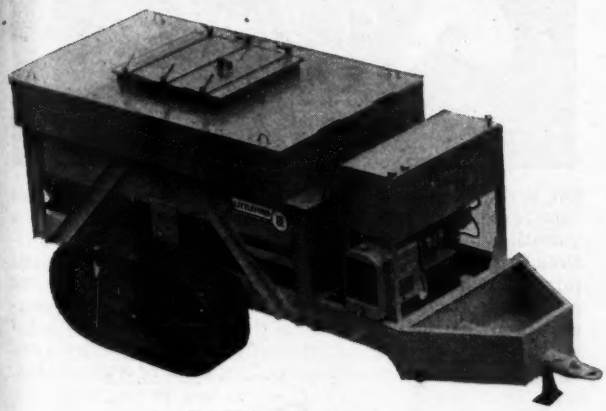
BETTIS

OIL AND GAS EQUIPMENT Digest

IT'S NEW CHECK IT

by John M. Spears

(1) PIPE-LINE COATING KETTLE, with 23-bbl. capacity, has a large low-pressure burner which lights instantly with no preheating and burns from 2 qt. to 15 gal. of kerosine or domestic fuel oil in an hour's time. Burner may be controlled to maintain proper operating temperatures throughout the melting cycle of the coating. Design incorporates a double heating and circulating system which distributes the heat over the entire sides and bottom of the kettle. This gives perfect heat distribution and eliminates "hot spots" which might cause warping of the bottom. There are no vent holes to cause flashing. Another feature of kettle is the hydraulic system for agitation. Hydraulic method of agitation keeps the mineral filler present in most coatings in suspension and prevents coking due to settling out of the filler. Agitation system will not break down when kettle is being loaded or if coating is not liquid enough. Overload relief valves on the hydraulic system prevent the agitator from breaking while the material is getting soft enough to allow agitation. System is fully automatic and requires the operator's attention only for stopping or starting. *M. J. Crose Manufacturing Co., Inc.*

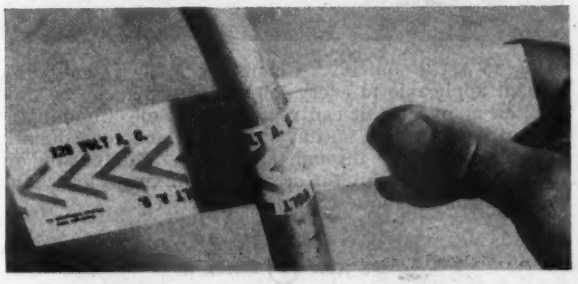


IT'S NEW CHECK IT

(2) LIGHT DRILLING UNIT drills at the rate of 30 ft. per hour in 16-in. diameter. Unit can be mounted on any standard truck. Portable drill is designed to pull out the dirt, leaving a clean hole into which a caisson or pipe can be inserted immediately. Temporary wells can be drilled right at the location needed, the drill moved from place to place as construction or other work progresses. Time and cost of hauling water from long distances is eliminated. Motor and drill are suspended from the boom, a switch is pressed, and the drill starts operating. When drill reaches the desired depth it is pulled out of the hole, carrying all the dirt with it. Besides drilling for water at desired locations, drills are used to make test holes, and for horizontal or angular holes for pipe, drains, conduit, etc. *KA-MO Tools, Inc.*

IT'S NEW CHECK IT

(3) E-Z CODE IDENTIFICATION MARKERS, the unusual self-adhesive strips used to speed up and simplify the coding of pipes, conduits, and cables, are now provided individually mounted on a unique new speed tab for even faster and easier application. Speed tab con-



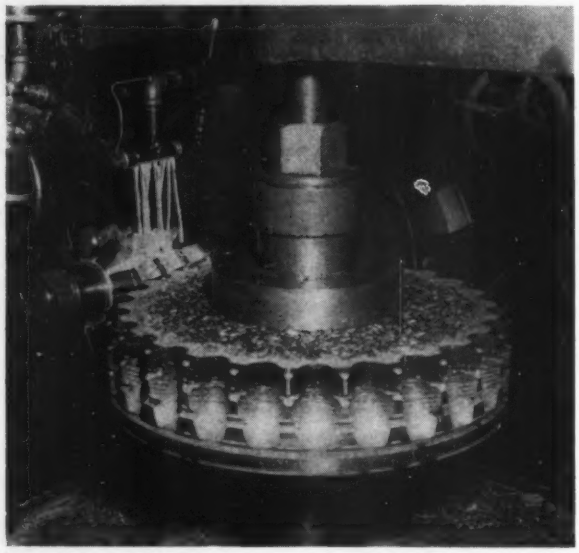
The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

Keep Informed. Save Time. Tear Out Card. Check It. Mail It.

sists of a 10-in. strip of cardboard that is perforated near one end. When it is broken at the perforation, the marker is quickly freed from the smaller segment of the card and applied to the pipe without moistening. By simply pulling the loose end of the card around the pipe, the marker is automatically and firmly applied. This speed tab makes the markers easy to apply even to inaccessible lines. Markers provide a permanent easy-to-read coding system that is unaffected by temperature or humidity. *Western Lithograph Co.*

IT'S NEW CHECK IT

(4) CHEM-CUT used in machining operations increases tool life resulting in greater production, fewer tool changes, less down time, greater feeds and speeds, finer finish, and fewer rejects. Coolant is made from tough lubricating oils, fortified with an element that causes



chips to settle quickly. Chem-Cut is a water-soluble coolant applicable to every job where water can be used and, on many jobs, it can replace black oil. Contains no carbon tetrachloride, sulfur, or alcohol, and consequently will not evaporate through circulation. This cutting oil requires no rust inhibitor or "special mixing." Free sample of 1 gal. on request. *Warner Lewis Co.*

IT'S NEW CHECK IT

(5) MAGNESIUM LOADING TUBES for refineries and bulk plants weigh less than a third as much as previously used. Such light tubes are very easy to change from car to car reducing worker fatigue, improving loading time, and reducing accidents. They are also nonsparking. Three-inch pipe-size tubes 11 ft. long are made by welding a short heavy-wall tube to a long thin-wall tube. The heavy-wall tube is threaded to standard pipe size for connection to the stationary steel pipe. A tube of this length reaches to within a few inches of the car bottom, reducing splash, loss by vaporization, and fire hazard. *Light Metal Products Co.*

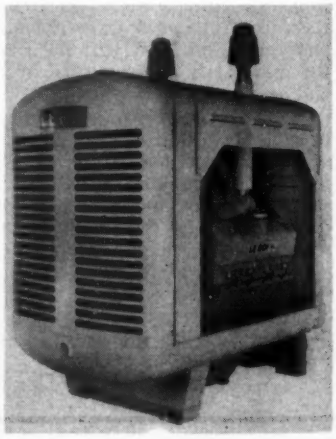
IT'S NEW CHECK IT

(6) NEW MIXING DEVICE controls corrosion in oil wells. A new method for controlling electro-chemical corrosion on tubing, sucker rods, and pump parts in pumping wells uses a specially designed mixing device to make a stable emulsion of the oil and brine before it enters the pump.

Oil is drawn into the mixer at its lower end and a tail pipe extends downward into the brine, permitting a variation of the oil-brine interface level. Metering orifices in the tail pipe and oil intake maintain a consistent mixture, which, after being emulsified in the mixer, has a high electrical resistance to the flow of currents generated in the well fluid. Thus the electro-chemical solution is eliminated or substantially reduced. Device does not create a costly treating problem. *Cypher System, Inc.*

IT'S NEW CHECK IT

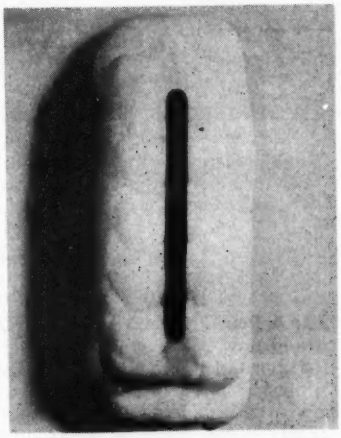
(7) VALVE-IN-HEAD ENGINE provides extreme flexibility with speeds up to 1,800 r.p.m. Designed to meet high-speed requirements, new engine provides smooth power throughout the speed range with conservatively rated horsepowers to 135. Unit is compact, easily accessible, and light in weight despite strains of continuous heavy-duty service. Runs on gasoline, butane, or natural gas. Valve-in-head design simplifies maintenance by providing greater accessibility. Features incorporated in engine are removable, wet-type cylinder sleeves; extra-heavy, counterweighted crankshaft; unit construction of crankcase and cylinder block; water-cooled manifolds; full-pressure lubrication; gear-driven water pump; modern cam-ground aluminum pistons; and push-button electric starting. *Le Roi Co.*



(8) NEW-TYPE DRILLING BIT permits the attaching of any desired number of cutting edges. Although it ordinarily is supplied with from four to eight cutting edges, bit may be equipped with as many as 20 to 30, if drilling conditions warrant. Cast-steel, crescent-shaped cutting elements are hard faced, and are designed to permit their being nested together or stacked on the end of the bit shank and welded in place to form a single unit. As the bottom, or lower, unit wears down, the welding which holds it to the cluster wears off to expose the next cutter, thus permitting drilling to proceed without coming out of the hole to put on a new bit. *Harvey D. Sandstone Co.*

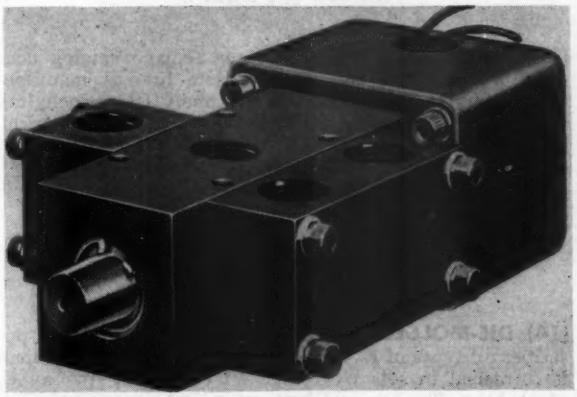
IT'S NEW CHECK IT

(9) NONFROSTING GAGE. New flat-glass gage is ideal for refineries, cycling plants, and generally for any plants in the chemical or petroleum industries where low temperature fluids must be gaged. It may be made in any material to meet any operating conditions. Gage is built with a special transparent frost-preventing unit, sealed to the gage glass, which projects beyond the cover bolts so the frost cannot build up across the vision slot in the cover forging. Design of gage not only insures against frosting but guarantees accuracy of reading. Gage is available in both reflex and transparent types. Glass will not frost up. *Jerguson Gage & Valve Co.*



IT'S NEW CHECK IT

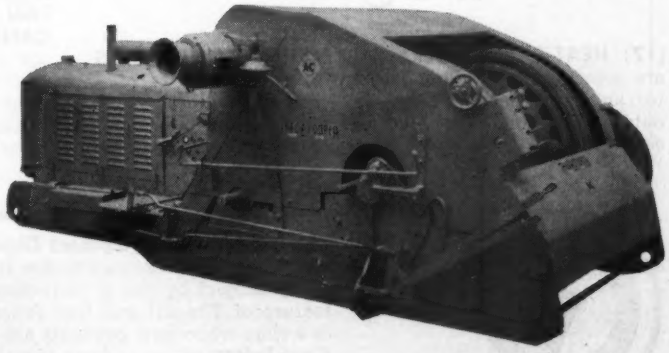
(10) FOUR-WAY SELECTOR VALVES are a.c. solenoid operated. Designed for service with water, oil, or air at operating pressures to 250 psi., this new series includes pipe sizes of ¼, ⅜, ½, ¾ and 1 in. Valves may be converted for d.c. operation merely by changing solenoids. Features of this series are (1) leakproof, "shear seal" design; (2) simplicity—only one moving part; (3) direct operation, thus eliminating the hazards of pilot operation; (4) fast, positive action under all conditions; and (5) ease of installation. Constant metal to metal contact of sealing members wipes away foreign material; hence, valve is not critical to dirt. Valve is two-position spring loaded in normal



position. Unit pictured is for ½-in. national pipe thread. *Saval, Inc.*

IT'S NEW CHECK IT

(11) WORKOVER AND DRILLING UNIT is a single-drum self-powered and unitized draw works. It is designed for drilling 4,000 to 6,000-ft. holes and handling workover jobs to 10,000 ft. Unit features air controls, with finger-tip convenience. Clutches are positive dental type, air actuated, and all moving parts are Timken-bearing mounted. Circulating air-cooled brakes on this unit are 52-in. diameter by 10-in. width. Each brake has two 5-in. equalized bands and each brake is equalized. Drum drives are so arranged that no chain is idling during any operation. Drums are free rolling with eight pulling speeds. Capacity is 13,000 ft. of ¾-in. line. Unit is powered by a six-cylinder Allis-Chalmers L844 engine, developing 590 ft.-lb. torque at 700 r.p.m. Unit is available with rotary drive, catheads, cross-arm spudder, mast, and two or three drums. *Fred E. Cooper, Inc.*



IT'S NEW CHECK IT

TRADE LITERATURE

(12) SELF-LOADING FLOATS. New two-color foldout bulletin, punched for ring binding, describes and illustrates new heavy-duty floats, one rated at 75,000-lb. capacity and the other at 100,000-lb. capacity. Complete data and oil-field applications included. *Hobbs Manufacturing Co.*

IT'S NEW ✓ CHECK IT

(13) FLEXIBLE COUPLINGS. New 24-page catalog contains working data on the complete line of manufacturer's flexible couplings. Covers many types including standard types S and A as well as shear pin, brake, drum, bolt-on, and detachable hub couplings. Data are given on forged-steel and cast semisteel construction. Capacity and dimension data cover all sizes. *Ajax Flexible Coupling Co.*

IT'S NEW ✓ CHECK IT

(14) DIE-MOLDED PACKING. New catalog section describes all types of EValpak die-molded packing. EValpak is furnished in sets with each set containing two types of packing. The top and bottom, or outer, rings of each set are wire-inserted jacketed rings while the center rings are die-molded plastic rings. *Edward Valves, Inc.*

IT'S NEW ✓ CHECK IT

(15) PROPER HANDLING OF BUTANE AND PROPANE IN RAILROAD TANK CARS is the title of new 20-page booklet. Booklet is generously illustrated and contains diagrammatic drawings which can be used in aiding employes who handle L-P gas products in railroad tank cars. Written in simple, instructive form. *Anchor Petroleum Co.*

IT'S NEW ✓ CHECK IT

(16) HARD-SURFACING ELECTRODES. New booklet describes hard-surfacing electrodes which consist of the following grades: special manganese-nickel shielded-arc electrodes, manganese shielded-arc electrodes, manganese-nickel bare electrodes, high-carbon shielded-arc electrodes, and medium-carbon shielded-arc electrodes. *Page Steel & Wire Division, American Chain & Cable Co., Inc.*

IT'S NEW ✓ CHECK IT

(17) HEAT EXCHANGERS AND VAPOR CONDENSERS are described in new bulletin. Twelve pages of text, photographs, and sectional drawings present comprehensive data on SK single and two-pass heat exchangers, vapor condensers, U-tube and tank-type exchangers, Radiafin tube exchangers, and vent condensers. Colored cross-section drawings included. *Schutte & Koerting Co.*

IT'S NEW ✓ CHECK IT

(18) CORROSION-PROOF COATINGS. New four-page folder shows how to cut costs in areas where corrosion is a problem. Included are many actual case histories from leading plants which are now using Prufcoat coatings. Coating is effective against corrosion from acids, alkalies, oil, and water. *Prufcoat Laboratories, Inc.*

IT'S NEW ✓ CHECK IT

(19) ELECTRICAL CONNECTORS. A two-color eight-page bulletin illustrates and describes manufacturer's standard line of molded Neoprene-rubber electrical connectors and associate equipment. *Mines Equipment Co.*

IT'S NEW ✓ CHECK IT

(20) TRAVELING BLOCKS. New bulletin entitled "A Better Traveling Block for Every Purpose" illustrates and describes the family of traveling blocks made by manufacturer. Charts and diagrams give all the information drilling superintendents, purchasing agents, and others connected with buying, want and need. *McKissick Products Corp.*

IT'S NEW ✓ CHECK IT

(21) SUPERSONIC REFLECTOSCOPE. Testing of welds in plate, thin sheet, and other sections with supersonic reflectoscope, using a new angle transmitter, is fully described in new sales data sheet. Fully illustrated. *Sperry Products, Inc.*

IT'S NEW ✓ CHECK IT

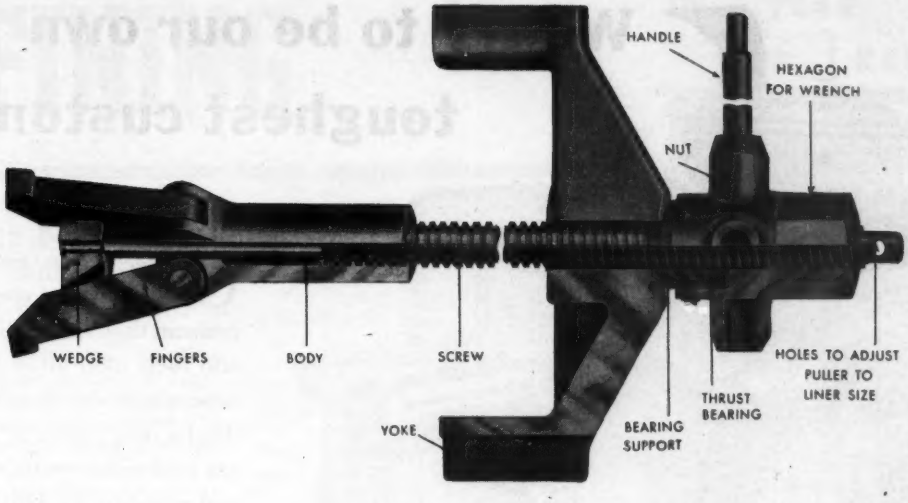
(22) A PUMP IS NO BETTER THAN ITS BARREL is the title of new brochure which describes the advanced heat-treating and honing methods used in the manufacture of Oilmaster pumps. Treatise tells an interesting story of how quality, low-cost pumps are mass produced by unique manufacturing techniques. *Fluid Packed Pump Co.*

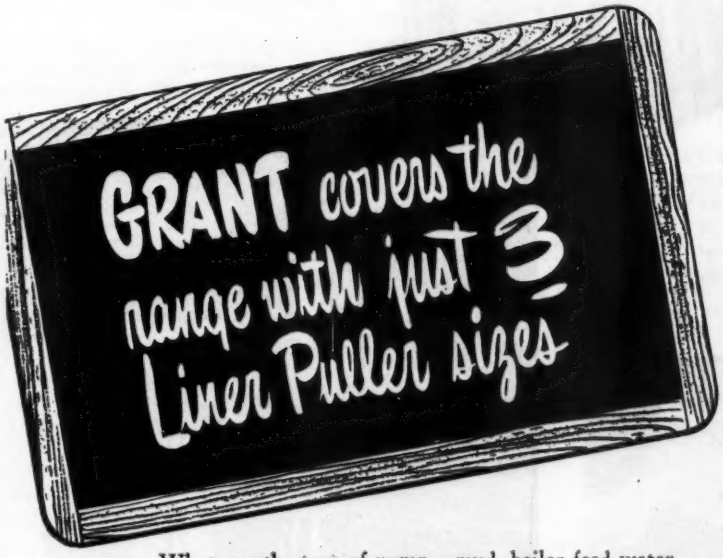
IT'S NEW ✓ CHECK IT

(23) CHEMICAL ADDITIVES FOR PETROLEUM LUBRICANTS is the title of a new 20-page educational booklet. It explains in nontechnical language what additives are, why they are needed, when and where they are used, and how they improve lubricating oils. Numerous illustrations serve to assist reader in understanding the complex subjects. *American Cyanamid Co.*

The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

Keep Informed. Save Time. Tear Out Card. Check It. Mail It.





Whatever the type of pump — mud, boiler feed water, or any other — if it has a removable liner you can pull it quickly and easily with the Grant Liner Puller. This versatile tool has no loose parts to get lost or require changing for different liner sizes. One tool pulls all liners within its size range and just 3 tools pull *all* commonly used liner sizes.

The Grant Liner Puller is designed to prevent damage to the liner bore . . . to pull direct and straight from the end of the liner . . . and to pull the most stubborn liner without fail. Its action is fast, positive and powerful.

SIMPLE TO OPERATE

Turning the screw clockwise collapses the fingers until they can be inserted through the liner and pass beyond the inner end of the liner. The yoke is next passed over the end of the pump cylinder on the studs, straddling the screw.

Simply rotating the nut clockwise exerts tremendous pull and results in quick removal of even the most stubborn liner. The nut is equipped with a roller thrust bearing to reduce friction and make turning easier, and a hexagon extension permits use of a wrench if necessary to gain additional power. The entire puller can be easily removed from the liner whenever desired.

The Grant Liner Puller is a mighty handy tool to have on the rig when a pump is down for liner renewal. It's of heavy steel construction throughout to give you years of service, and just three sizes meet all liner pulling needs. *The Grant representative in your territory will gladly supply you with complete details — or write direct!*

Proven GRANT Tools

Used Where Performance Counts

Hydrostatic Bailers	Bulletin No. 11
Liner Pullers	Bulletin No. 14
Pressure Releases	Bulletin No. 15
Casing Scrapers	Bulletin No. 17
Wall Scrapers	Bulletin No. 20
Bottom Hole Scrapers	Bulletin No. 21
Underreamers (Rotary)	Bulletin No. 24
Underreamers (Cable Tool)	Bulletin No. 27
Hole Enlargers	Bulletin No. 38
Reamers	Bulletin No. 43
Hydrostatic Perforation Cleaners	Bulletin No. 50
Dump Bailers	Bulletin No. 51
Roller Cutter Shale Bits	Bulletin No. 54
Sand Pumps	Bulletin No. 55
Impression Block Tool	Bulletin No. 56
Well Cleanout Equipment	Bulletin No. 57

Write for Descriptive Bulletins on these GRANT Tools

GRANT OIL TOOL COMPANY

Main Office and Plant: 2042 East Vernon, Los Angeles 11, California

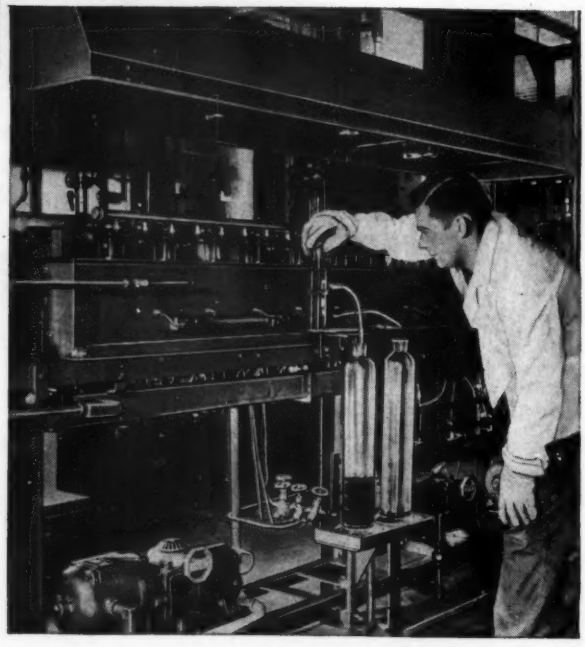
Branches at Bakersfield, Avenal and Ventura, California,

and at Odessa and Houston, Texas

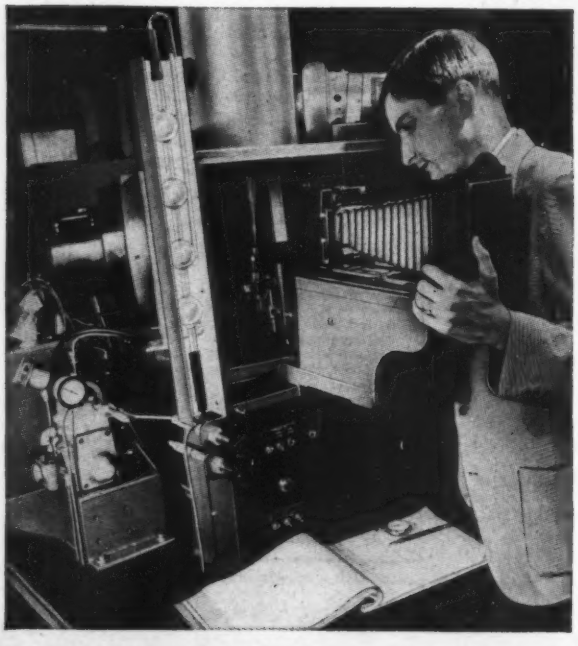
We try to be our own toughest customers!

OUR technicians are tougher than our customers. They demand that Texaco lubricants and fuels more than meet the requirements of specified jobs. That's why Texaco products are producing greater efficiency and economy for industry and transportation throughout the world.

Bringing a 600 horsepower railroad Diesel unit right into the laboratory enables Texaco engineers to make "transcontinental runs" and other severe tests under controlled conditions . . . a step to assure the maximum efficiency and economy of Texaco Diesel fuels and lubricants in actual railroad service.



Anticipating expansion of furfural installations, Texaco is installing a new pilot plant in its laboratories. With this unit, Texaco can help licensees of furfural process to modernize old equipment and to improve the design of new units.



High speed photography and stroboscopic light make possible study of unknown fuel spray patterns of injection nozzles in internal combustion engines. New test stand gives results which have helped to produce greater efficiency of air and fuel use in engines.

THE TEXAS COMPANY

Petroleum Promotes Progress

TEXACO REG. T.M.

REFINING

Northwestern Buys Allied Plant at St. Elmo, Ill.

Northwestern Refining Co., St. Paul Park, Minn., has purchased the Allied Oil Corp. refinery at St. Elmo, Ill., about 70 miles east of St. Louis, Mo. The plant, located on the Chicago and Eastern Illinois railroad and serviced by a transcontinental pipe line, has been closed since 1945.

Repair work necessary for the reopening is under way and the plant is expected to be in operation in about 60 days. The plant has a 5,000-bbl. per day skimming unit and a 2,000-bbl. per day thermal cracking unit.

The St. Elmo purchase brings to three the number of refineries now being operated by Northwestern. The company's first refinery was built in St. Paul Park in 1939, and the second one, at New Brighton, Minn., was purchased in 1947. Arthur T. Erickson is president and Elmer R. Erickson is general manager.

The company recently announced purchase of 140 acres of land at Hartford, Ill., where it will build a crude-oil storage terminal. Construction of an 80,000-bbl. tank on the property was started July 6.

The company recently constructed a pipe line gathering system in new oil fields in Reeves County, Texas. Headquarters of the new crude-oil purchasing department has been established at Tulsa. Division purchasing offices are at Midland and Pecos, Tex.

Globe Will Install New Cracking Unit

Globe Oil & Refining Co. has contracted with Universal Oil Products Co. for the installation of a fluid catalytic cracking unit at Globe's Lemont, Ill., refinery.

Through use of the existing feed-preparation equipment, the catalytic cracker will handle 6,000 bbl. of heavy vacuum gas oil per stream day at 50 per cent conversion level.

Sunray Training Schools To Be Held at Two Plants

Two foremanship training schools were scheduled to be opened this month by Sunray Oil Corp. for its supervisory personnel at Allen and Duncan, Okla., refineries, it was announced recently by James T. Rasbury, Sunray's director of employe relations.

The 5-day training session was scheduled to open at Allen September 6 and at Duncan September 20. The course, designed to stress fundamentals of supervision, will be conducted by M. L. Powers, director of the engineering extension division, Oklahoma A. & M. College, Stillwater, Okla.

Gasoline Tax Revenues Show 10 Per Cent Gain

Federal gasoline tax collections for the first 7 months of this year amounted to $267,394,258, a gain of 10.5 per cent over the corresponding period for 1947, according to the Bureau of Internal Revenue.

July collections on the gasoline tax amounted to $40,715,753, an increase of 5.5 per cent over the same month a year ago.

Revenue from lubricating-oil tax totaled $47,511,704 in the first 7 months of this year, a gain of 6.2 per cent over the same period last year. For July lube-oil revenue was $5,599,745, an increase of approximately 1 per cent over July of last year.

Pipe-line tax receipts on oil for the month of July amounted to $1,670,613, an increase of 23.8 per cent over the period a year earlier.

Special Tankship Carries Formaldehyde in Bulk

CORPUS CHRISTI. — A specially built tankship has been placed in operation to transport bulk shipments of formaldehyde from the petrochemical plant of Celanese Corp. of America near Bishop.

The vessel is a converted LST containing seven insulated and heat-controlled compartments lined with stainless steel. It was scheduled to arrive last week at the Port of Corpus Christi to load its initial cargo.

The formaldehyde will move to New Haven, Conn., where Celanese has established a 7,000,000-lb. bulk storage terminal to supply users through a fleet of insulated aluminum tank trucks. The special tankship will carry 435,000 gal. of formaldehyde and other chemicals and is expected to move between 50,000,000 and 60,000,000 lb. annually.

Celanese expects to continue to use rail movement to ship formaldehyde

IN 1 YEAR
FOR 1 REFINER

PETRECO
Electric DESALTING

Increased throughput 32.4%.
Lengthened average runs 123.0%.
Reduced down time 46.8%.
Saved 23,494 maintenance man hours.
Increased avg. V.B.O.T. Transfer line temp. 35°F.
Increased avg. Preheat temp. 40°F.
Increased preheat duty, 10⁶ BTU/hr 59°F.

Petreco Knows How

EVERY YEAR
FOR ALL CUSTOMERS

PETRECO
Electric DESALTING

Provides regular SERVICE.
Offers LABORATORY FACILITIES.
Keeps available a full stock of REPLACEMENT PARTS.
Cooperates with ENGINEERING ASSISTANCE.
Supports Petreco Desalting with EXPERIENCE gained from many years of desalting activity.

Petreco Knows How

ANYTIME
FOR ANY REFINER

PETRECO
IS READY

To call at your convenience.
Survey your salt problem.
Make preliminary cost estimates.
Arrange for salt analyses of your crude in the Petreco Labs.
And furnish a written proposal complete with plans, prints, figures.

Petreco Knows How

Call or write your nearest Petreco headquarters. Get ALL the facts . . . it pays.

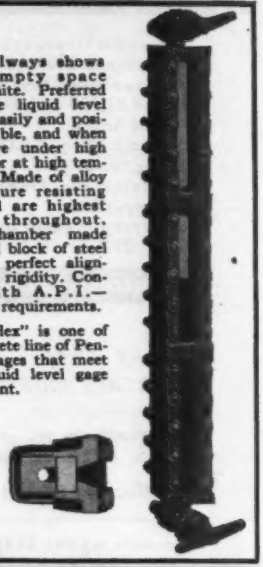
PETROLEUM RECTIFYING COMPANY
5121 S. Wayside Drive, Houston 1, Tex.
648 Edison Building, Toledo 4, Ohio
530 W. 6th St., Los Angeles 14, Calif.

PETRECO
Electric DESALTING · DEHYDRATING

PENBERTHY
"REFLEX"
DROP FORGED STEEL
LIQUID LEVEL GAGES

Liquid always shows black—empty space shows white. Preferred where the liquid level must be easily and positively visible, and when liquids are under high pressure or at high temperature. Made of alloy temperature resisting steel and are highest quality throughout. Liquid chamber made from solid block of steel to assure perfect alignment and rigidity. Conform with A.P.I.—A.S.M.E. requirements.

The "Reflex" is one of the complete line of Penberthy Gages that meet every liquid level gage requirement.



PENBERTHY INJECTOR CO.
DETROIT, MICH. Canadian Plant WINDSOR, ONTARIO

TRECo
REFINERY
CONSTRUCTION

If you are planning an expansion or an entirely new refinery or chemical plant, a call from you will be appreciated. We can handle the complete project from drafting boards to operating profits.

- DESIGN
- CONSTRUCTION
- OPERATING SURVEYS

THE REFINERY ENGINEERING CO.
Tulsa Chicago

and other products, principally to the West Coast. Principal raw materials for the Bishop plant is butane and propane obtained from La Gloria Corp. and Chicago Corp.

A development somewhat similar to Celanese's use of the tankship for chemicals was the christening more than a year ago by Warren Petroleum Corp. of a specially converted tankship to carry propane.

Fuel Oil Standards Revised by Bureau

The National Bureau of Standards has announced a revision of Fuel Oils, Commercial Standard CS12-40, the revision to be identified as Commercial Standard CS12-48. The specification covers five grades of fuel oil for various types of fuel oil burner equipment.

Until printed copies are made available mimeographed copies may be obtained from the Commodity Standards Division, National Bureau of Standards, Washington.

Socony-Vacuum Develops New Plasticizing Oil

Development of "S/V Sovaloid A Special"—a plasticizing oil for many compounds of natural rubber, neoprene, and GR-S (Buna-type synthetic)—has been announced by the chemical products department of Socony-Vacuum Oil Co., Inc.

The new petroleum product, which has a bright, clear, amber color, is more resistant to discoloration than any other general-duty plasticizer now in use in the rubber industry and produces tight, snappy vulcanizates with excellent aging qualities, company officials said.

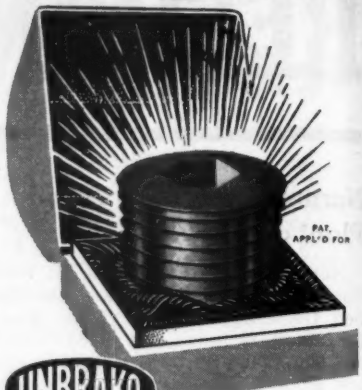
The new plasticizing oil, which has a comparatively low viscosity and pours freely at below-zero temperatures, is being produced in the Socony-Vacuum refinery at Paulsboro, N. J.

Ashland Will Modernize 10,000-Bbl. T.C.C. Unit

Engineering and construction contract for the modernization of the Ashland Oil & Refining Co.'s T.C.C. unit at Catlettsburg, Ky., has been awarded Catalytic Construction Co., Philadelphia, Pa. Completion is expected by October 1.

The contract calls for the complete modernization of the existing 10,000-bbl. per day unit. Changes include increased kiln carbon burning capacity and conversion to solid bed design and a new catalyst distributing system. Revision in the piping and instrumentation will also be made so that the unit will compare favorably with the latest design.

New and Exclusive



UNBRAKO Reg. U. S. Pat. Off. "FULLY FORMED"
PRESSURE PLUGS

These entirely new and exclusive precision-made plugs—for water, steam, air, oil and hydraulic pressure—are fully formed with the roundness and concentricity so desirable in a plug. Tests have proven that they materially reduce leakage on some applications and eliminate it entirely on others.

"Unbrako" Plugs—made by the manufacturer of the famous "Unbrako" Socket Screw Products—are available in National Pipe Thread sizes from 1/16" to 1¼". Write for detailed information and samples.

OVER 45 YEARS IN BUSINESS
STANDARD PRESSED STEEL CO.
JENKINTOWN, PA., BOX 790
Chicago • Detroit • Indianapolis • St. Louis
San Francisco

INDUSTRIAL
OIL AND GAS
BURNING
EQUIPMENT
NATIONAL AIROIL
BURNER CO., INC.
1236 E. Sedgley Ave., Philadelphia 34, Pa.

"GUNITE" CONCRETE
(SINCE 1915)
LININGS FOR
BUBBLE TOWERS • SETTLERS • STILLS • SEPARATORS • TANKS • AND VESSELS OF ALL TYPES • ENCASING AND FIREPROOFING STRUCTURAL STEEL AND PIPE • LINING WATER RESERVOIRS, DITCHES, DRAINS AND CANALS • REPAIRING DISINTEGRATED CONCRETE AND OTHER MASONRY.
GUNITE CONCRETE & CONST. CO.
1301 Woodswether Rd., Kansas City 6, Mo.
District Branch Offices
R. N. Turner, Dist. Mgr., 228 No. La Salle St., Chicago 1, Ill. B. H. Mueller, Dist. Mgr., 6625 Delmar Blvd., University City (St. Louis), Mo. Philip D. Barnard, Dist. Mgr., 2036 Addison, Houston 5, Tex.
Branch Offices: Denver, Dallas, New Orleans

FOR *better* LUBE OIL, FUEL OIL, GREASE, GASOLINE

GLIDDOL

the Soybean Derivative by Glidden...

Pacemaker in Soya Research

• In their highly successful campaign to provide better lubricating oils for all types of engines, many chemists have found in Gliddol, a soybean derivative by Glidden, the perfect blending agent and inhibitor. Gliddol effectively retards oxidation to protect engine parts—reduces surface tension to promote thorough blending of oil and additives—disperses insoluble solids to extend the useful life of the lubricant. And this remarkable soybean additive is equally effective in grease!

Used in leaded and unleaded gasoline, Gliddol serves as a protective colloid to prevent the formation of any precipitate and to retard the deterioration of the material on exposure to sunlight. In fuel oil, Gliddol R, a special Gliddol product, has proved useful in reducing the formation of precipitate under heating and in giving the oil a lighter color than untreated varieties.

The Glidden Technical Service will cooperate with you in determining the quantity of Gliddol or Gliddol R that will prove most effective in any formula. Write today for further details.

QUALITY Glidden PRODUCTS

The Glidden Company

SOYA PRODUCTS DIVISION

5165 West Moffat Street
Chicago 39, Illinois

Vitron★
GLASS FIBER

UNDERGROUND PIPE WRAP

How It Is Used:

When Vitron Underground Pipe Wrap is applied with conventional coating and wrapping machines, the hot coating permeates and saturates the glass fiber mat. The glass fiber then becomes an integral part of the coating thus reinforcing it uniformly throughout the surface of the pipe.

Vitron is available for immediate shipment from warehouse stocks in Tulsa.

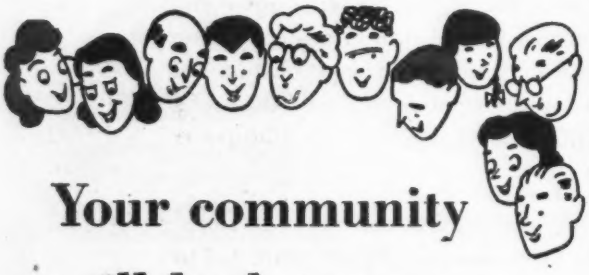
Why It Is Used:

1. Reinforces the coating—both tensile and impact strength are improved.
2. More uniformity of coating thickness from top to bottom of pipe.
3. Application method eliminates "Holidays" due to air or vapor bubbles in coating
4. Allows for application of greater thickness of coating
5. Non-Hygroscopic glass fibers will not absorb moisture
6. Inorganic glass fiber cannot rot or decay.
7. Light in weight—easy to handle and apply
8. Economical—less than 1.5 cents per square foot.

★ Vitron is the trade name of glass fiber underground pipe wrap manufactured by Glass Fibers, Inc., Waterville, Ohio, and sold all over the world by M. J. CROSE Manufacturing Co., Inc.

M. J. CROSE MANUFACTURING CO., INC.

2715 DAWSON ROAD TULSA, OKLAHOMA PHONE 6-0265

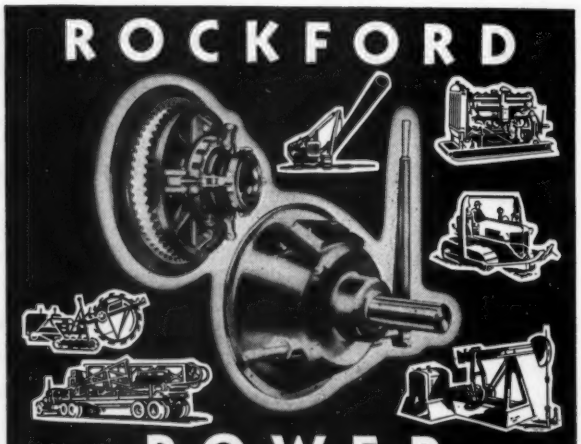


Your community will look to *you* on October 14th*

*Oil Progress Day

START PLANNING NOW!

ROCKFORD POWER TAKE-OFFS



SELF CONTAINED UNIT
WIDE RANGE OF SIZES
CONSERVATIVE RATING
ROLLER BEARINGS
FINE ADJUSTMENT
ACCURATE BALANCE
S.A.E. DIMENSIONS

* The clutches used in ROCKFORD POWER TAKE-OFFS are carefully balanced to prevent centrifugal force from affecting efficient operation. A special machine checks the balance of each clutch within extremely close limits, before it passes final inspection.

Send for This Handy Bulletin

Shows typical installations of ROCKFORD CLUTCHES and POWER TAKE-OFFS. Contains diagrams of unique applications. Furnishes capacity tables, dimensions and complete specifications.

ROCKFORD CLUTCH DIVISION BORG-WARNER
1305 Eighteenth Avenue, Rockford, Illinois, U. S. A.

PIPE LINES

Change in Design Will Boost Tapline Capacity

AS a result of a change in design the ultimate capacity of the Trans-Arabian pipe line can be increased to 500,000 bbl. of oil daily through the use of six auxiliary booster pump stations to reinforce Tapline's initial six pump station project.

B. E. Hull, president of Trans-Arabian Pipe Line Co., said that the change in design was adopted because of recently revised forecasts of the prospective future petroleum needs of European countries and others west of the Suez Canal.

Provision for the prospective increase in throughput capacity does not materially change the steel requirements for the line. For the 300,000-bbl. project, 323,000 tons of steel are required for pipe, oil tanks, engines, pumps, terminal facilities and other structures. The 500,000-bbl. project will require additional oil tanks, pumps, engines, and terminal facilities on the Mediterranean Coast and an ultimate total of 365,000 tons of steel.

If tankers were employed for daily movement of 500,000 bbl. of Arabian crude from Ras Tanura on the Persian Gulf to the Mediterranean, a fleet of at least 102 T-2 tankers or their equivalent would be in continuous operation on these 7,000-mile round-trip voyages. Construction of this fleet of tankers with necessary additional pipe lines and loading facilities at Ras Tanura would require 565,400 tons of steel.

Completion of Tapline's project is expected in the summer of 1950, contingent on resumption of pipe shipments this fall. The additional capacity can be attained within a year from that date.

Texas Gas Is Granted Emergency Authorization

Texas Gas Transmission Corp. has been granted emergency authorization by the Federal Power Commission to construct and operate a 63-mile, 26-in. natural-gas pipe line and additional compressor facilities. The proposed line would extend from the Lula, Miss., compressor station to a point of connection with the existing distribution system of its customer, Light, Gas & Water Division of Memphis, Tenn. Total estimated cost of the facilities is $3,287,763. Contract was recently let to N. A. Saigh Co. for the project, which was granted emergency authorization in order to supply gas in that area during the coming winter.

FPC recently set a hearing to open September 22 concerning the company's application seeking authorization to construct facilities to deliver natural gas to Indiana Gas & Water Co. Proposed facilities include 7½ miles of 8⅝-in. lateral pipe line from a point on the Texas Eastern system extending to the nearest connection with the Horseshoe system of Indiana Gas near Mitchell, Ind.

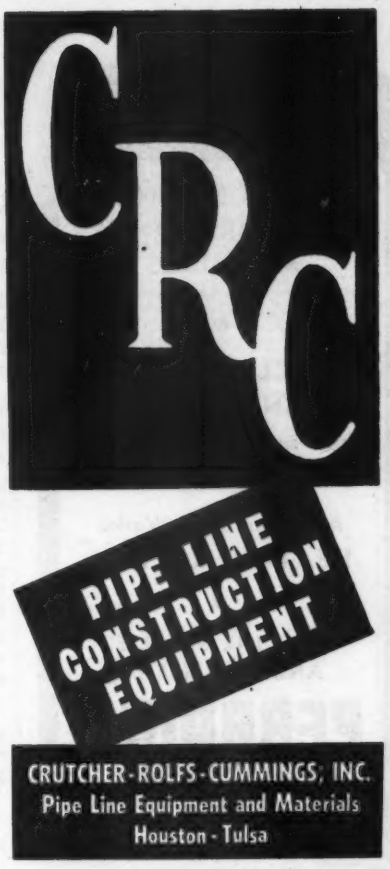
Texas Gas Transmission's application also requests that the FPC direct Texas Eastern to sell and deliver approximately 5,000,000 cu. ft. of natural gas through Texas Gas Transmission's existing connection with Texas Eastern at Seymour, Ind., and also through the lateral requested in the application.

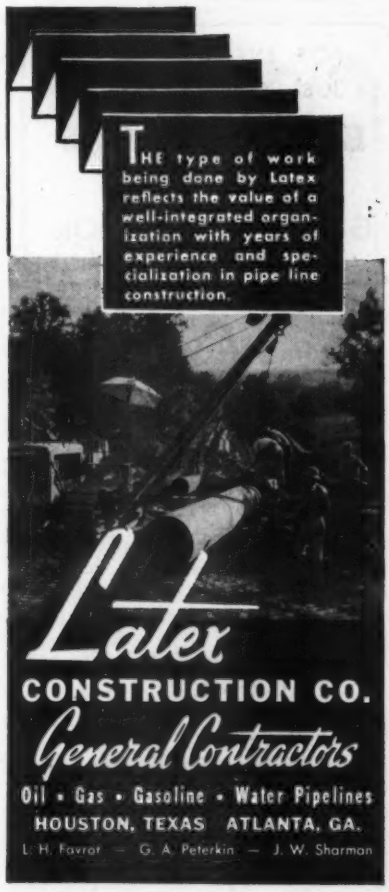
Crude-Oil Movements Through Eastern States

Mid-Continent and Illinois crude oils from western lines as well as Gulf Coast crude oils shipped by tanker through East Coast ports are being handled simultaneously by certain Pennsylvania and West Virginia pipe line systems which are also continuing their customary service of shipping crude oil from local fields.

Eureka Pipe Line Co. receives Illinois and Mid-Continent crude oils from South West Pennsylvania Pipe Lines for delivery into the Charleston, W. Va., area. The Eureka system also moves crudes from the Gulf Coast delivered by tanker to Philadelphia harbor and forwarded from there to Eureka via National Transit Co. and Southern Pipe Line Co. Furthermore, the Eureka system consisting of 3,750 miles of gathering lines and 200 miles of trunk lines extends over West Virginia, connecting with four refineries and shipping Pennsylvania Grade crude northward via South West Pennsylvania Pipe Lines and National Transit Co. for delivery to Pennsylvania refineries.

South West Pennsylvania Pipe Lines moves both Illinois and Mid-Continent crudes received from lines of Ohio Oil Co. and Buckeye Pipe Line Co., via the line of Tuscarora Oil Co., Ltd., as well as Gulf Coast crudes




THE type of work being done by Latex reflects the value of a well-integrated organization with years of experience and specialization in pipe line construction.
Latex
CONSTRUCTION CO.
General Contractors
Oil • Gas • Gasoline • Water Pipelines
HOUSTON, TEXAS ATLANTA, GA.
L. H. Favrot — G. A. Peterkin — J. W. Sharman

"Everything for the Pipeliner"

PIPE COATING and WRAPPING MACHINES
Stationary and Line Traveling

PIPE CLEANING and PRIMING MACHINES
Stationary and Line Traveling

American Steel Works
HEATING KETTLES

PIPE LINE SUPPLIES AND EQUIPMENT

PERRAULT Brothers INC.
1130 NORTH BOSTON
TULSA 6, OKLAHOMA
Phone 5-1104

FOR EVERY PIPELINE JOB—YOU CAN'T BEAT
BOYD SERVICE
and the
GENERAL PIPE HOOK

For handling pipe. All steel with wide flanges. Sizes for 4" to 30" pipe.

CLARENCE L.
BOYD
CO.
TULSA, OKLAHOMA

coming by tanker via Philadelphia and arriving through its connection with Eureka Pipe Line Co. This Gulf Coast crude oil is transported as a consignment to a final destination at a refinery on Lake Erie. The South West Pennsylvania Pipe Lines operates 1,272 miles of gathering lines and 400 miles of trunk lines extending over four counties in southwest Pennsylvania, delivering to three refineries in the Pittsburgh area and forwarding to other Pennsylvania refineries.

Following World War II Southern Pipe Line Co.'s trunk line was idle but new business has been lately secured. Pumping arrangements have been reversed for handling crude oil shipped westward from the harbors of either New York or Philadelphia. The Southern Pipe Line Co. system extends from a connection with National Transit Co., at Millway (near Lancaster, Pa.) to the Mason-Dixon line north of Morgantown, W. Va., where a connection is made with Eureka Pipe Line Co.

FPC Speeds Hearing Of Three Companies

The Federal Power Commission has set September 16 for oral argument and has ordered omission of the intermediate decision procedure in proceedings involving applications filed by Atlantic Seaboard Corp., Virginia Gas Transmission Corp., and Tennessee Gas Transmission Co. requesting authorization to construct additional natural-gas transmission facilities.

Atlantic Seaboard and Virginia Gas Transmission seek authority to construct and operate 268 miles of 26-in. pipe line extending from Clendenin, W. Va., to Rockville, Md. Cost of the line and appurtenant facilities has been estimated at $20,649,600.

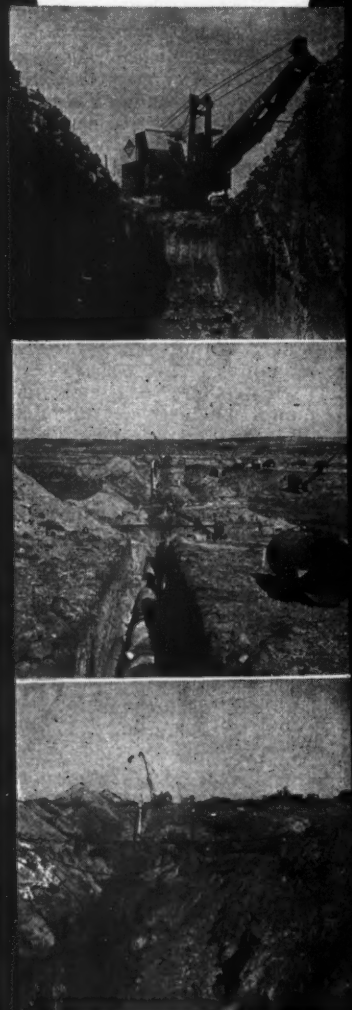
Tennessee Gas Transmission's request is for authorization to construct and operate about 900 miles of loops along its existing main pipe line, approximately 395 miles of 26-in. main line from northeastern Kentucky through Ohio and western Pennsylvania to the vicinity of Buffalo, N. Y., compressor units aggregating 91,200 hp., and various other appurtenant facilities. Cost has been estimated at $122,905,000.

Lone Star Begins 70-Mile Gas Line

Eastern Construction Co., Dallas, Tex., has begun work on a 70-mile, 20-in. gas line for Lone Star Gas Co., from Opelika in Henderson County, East Texas, to the company's transmission system serving Dallas County.

D. A. Hulcy, president, Lone Star, said the new line would add 180,000,000 cu. ft. daily capacity to the present transmission system. The line will run

PIPELINES
OIL PIPELINES GAS PIPELINES GASOLINE PIPELINES WATER PIPELINES
• Finances
• Equipment
• Organization
TO BUILD



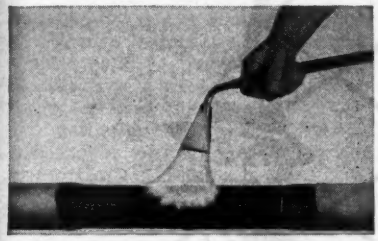
R. H. Fulton & COMPANY
CONTRACTORS
R. H. FULTON, OWNER

PHONE 5231 BOX 1542
LUBBOCK, TEXAS

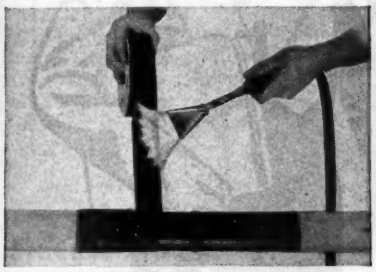
It's EASY to Protect PIPE JOINTS with TAPECOAT

Just follow three simple steps

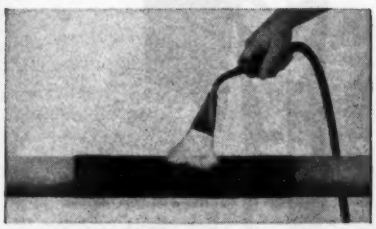
A practical, protective coating in handy tape form, TAPECOAT is easy to apply on pipe joints to give protection equivalent to the mill or machine coating on the pipe. It's clean—no dirt, no mess. Saves time and labor. Economical. Here's all you do:



STEP 1—Remove kraft paper on mill or machine coating back far enough to start one spiral wrapping of TAPECOAT over mill coating. Clean and dry bare pipe with torch as shown.



STEP 2—Start wrapping TAPECOAT where kraft paper has been removed. Flash flame of torch *lightly* on TAPECOAT to bleed its coating. Secure double thickness of TAPECOAT by overlapping slightly more than half the width of the tape.



STEP 3—Finish wrapping TAPECOAT. When wrapping is completed, flash the torch flame over entire TAPECOATED section to bleed coating to a shiny surface.

Write for complete details

The TAPECOAT Company
1523 Lyons St., Evanston, Illinois

OIL PIPELINES GAS PIPELINES GASOLINE PIPELINES WATER PIPELINES

through Van Zandt and Kaufman counties and will bolster supplies along its entire length, it was said.

Equipment and materials for the new $3,500,000 line have been assembled near Athens, from which point crews are now working.

Texas Eastern and Texas Gas Hearing Consolidated

The Federal Power Commission has consolidated hearing on Texas Eastern Transmission Corp.'s request for authorization to construct additional facilities to increase its pipe-line delivery capacity between Lebanon, Ohio, and Windridge, Pa., with the hearing set for September 27 on an amended application filed by Texas Gas Transmission Corp. requesting authorization to construct and operate a Texas-to-Middletown, Ohio, pipe line.

The commission consolidated the hearings as the two applications request authorization to construct facilities for the transportation and sale of approximately 350,000,000 cu. ft. of natural gas daily to serve the areas now supplied by Texas Gas. In a news item appearing in The Oil and Gas Journal, August 26, page 172, concerning authorization for additional facilities to expand capacity of the Memphis division, the company concerned was Texas Gas Transmission Corp. and not Texas Eastern Transmission Corp. as was stated.

Texas Eastern's request for authorization includes construction of about 178 miles of looping and 15,000 hp. in compressor units which will increase by 235,000,000 cu. ft. daily the portion of the Inch lines between Lebanon and Windridge and also facilities to increase the capacity of its Little Inch line south of Lisbon, La., to enable it to deliver approximately 200,000,000 cu. ft. of gas per day to Texas Gas at a connection near Lisbon. Total cost has been estimated at $24,052,000.

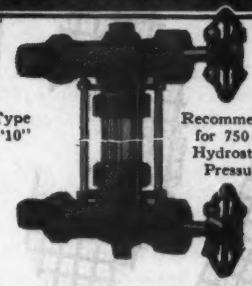
Texas Gas Transmission's proposed line would extend from Carthage field of East Texas to Middletown, approximately 840 miles. Cost of the line and additional facilities would approximate $73,500,000.

Texas Awards Contract To Salvage 140-Mile Line

The Texas Pipe Line Co. has awarded a contract to Latex Construction Co. of Houston to take up and recondition approximately 140 miles of pipe line of varying diameters between Humble pump station and Port Arthur, R. B. McLaughlin, president of the pipe line company, announced recently.

A new 20-in. line is being laid along the route of the line which is being salvaged.

PENBERTHY
DROP FORGED STEEL
LIQUID LEVEL GAGES



Steel construction throughout with stainless steel interior trim. Automatic shut-off is positive and instantaneous; stainless steel balls shut off the flow of liquid when glass breaks. Heavy duty stuffing boxes, union connections, offset construction facilitate cleaning and simplify glass replacement. Conform with A.P.I.—A.S.M.E. requirements.

This is one of the complete line of Penberthy gages that meet every liquid level gage requirement.

PENBERTHY INJECTOR CO.
DETROIT, MICH. Canadian Plant WINDSOR, ONTARIO

S. E. HUEY & CO.
ENGINEERS & SURVEYORS
OUACHITA BANK BLDG.
MONROE, LA.

SURVEYING & MAPPING

PIPE LINE SURVEYS

KOLOR KUT WATER FINDING PASTE — IMPROVED

INCREASE YOUR PROFITS BY making possible more accurate inventory gauging. Now Golden Brown—turns Red on contact with water level.

Gauges acid water, alkaline water, many chemical solutions. Also KOLOR CUT GASOLINE GAUGING PASTE.

Write
KOLOR KUT PRODUCTS CO.
Box 5415 • Houston 12, Texas

LCP*

MEET

MY PARTNER-R-R

. . . and YOUR POWER ADVISOR

Got power troubles? Costs too high? Frequent breakdowns? Here's the man to get you out of that hole . . . the Power Engineer. He has all the facts on LOW COST POWER—Utility Electric Power! Low cost because you pay less for power-driven equipment . . . less to keep it running. Get fast starting in all weather, s-l-o-w depreciation. Save on repairs, labor costs, supply costs. Your best bet for portability, too! Call your nearest Utility Electric Power Company. Get the facts about LCP—LOW COST POWER!

Yesterday's low price—today's high value.

Use Utility Electric Power!

PETROLEUM ELECTRIC POWER ASSOCIATION

*GEARED TO THE TEMPO OF EACH NEW D

Utility ELECTRIC POWER *

Box 1498, Oklahoma City, Oklahoma

NATURAL GAS

Symonds Proposes Easing Appalachian Gas Supply

A depression or "slow down" in business might find gas-distribution companies in the Appalachian area with too much gas under contract, Gardiner Symonds, president of Tennessee Gas Transmission Co., Houston, Tex., told the group attending the Eighth Annual Appalachian Gas Measurement Short Course last week at Morgantown, W. Va.

Symonds said that instead of trying to saturate the Appalachian area with gas for boiler fuel his company is seeking to extend its lines into New York and New England where new markets are in desperate need of gas for specialized purposes.

A nation does not have a balanced fuel economy when one area is using gas to fire boilers and another is still using coal to cook with, the gas executive said.

The Tennessee Gas president, whose company is the principal supplier of southwestern gas to augment the output of Appalachian fields, said that the capacity of his system has more than doubled since 1944 and soon will be three times that of its original line. If all present plans of various companies are carried through, 600 billion cubic feet of gas per day from the Southwest will be flowing to the Appalachian area.

Texas Sets Natural-Gas Production Allowables

AUSTIN.—Allowables for the production of sweet and sour natural gas from Texas fields for September have been set this week by the Railroad Commission. Daily allowables in cubic feet are:

District 2 (Southwest Texas)—North McFaddin, 22,900,000.

District 3 (Gulf Coast)—Alief, 9,000,000; Blue Lake, 28,500,000; McCoy, 4,980,000; Needville, 23,033,333; North Louise, 4,909,999; Old Ocean, 227,938,000; Sublime, 7,000,000.

District 4 (Southwest Texas) — La Blanca, 15,856,998; McAllen, 14,166,666; Riverside, 10,298,633; Rooke, 15,885,666; South Weslaco, 32,958,332.

District 6 (East Texas)—Carthage, 494,487,067; Huxley, 3,500,000; Navarro Crossing, 11,149,833; Oakwood, 6,214,833; Rodessa, 32,356,298; Tri-Cities, 20,213,333; Waskom, 78,127,333; Whelan, 80,393,332.

District 7 (West Central Texas)—Sipe Springs high pressure, 1,533,333; Eden, 3,766,666.

District 10 (Panhandle) — Panhandle, 750,000; Texas Hugoton, 134,938.

Gas Consumed by Power Plants Sets New Record

Electric utility power plants consumed 48,435,403,000 cu. ft. of gas during July 1948, a new monthly record and a gain of 29.9 per cent over the same month a year ago and 11.6 per cent above the consumption of a month earlier.

Fuel oil consumed during July totaled 3,186,153 bbl., a decrease of 14.2 per cent compared with July last year, and an increase of 3.3 per cent over June 1948. Based on July use, fuel-oil stocks on hand August 1, 1948, were sufficient to last 82 days compared with 79 days a month before and 52 days a year ago.

Use of coal by electric utility power plants for July increased 15 per cent over that of a year ago and was 2.6 per cent above consumption of the month previous.

Personnel Conference Plans Discussion Topics

Discussions directed particularly to the responsibilities of utility industrial relations and personnel executives will feature the Third Annual Personnel Conference of the American Gas Association to be held in Chicago, Ill., Nov. 18-19. Co-sponsors of the conference are the A.G.A. personnel committee and the Midwest, Southwest, and Great Lakes personnel conference groups of the A.G.A.

Topics scheduled for presentation and discussion include retirement systems, health services, trends in absenteeism, fringe benefit and labor costs, employe training based on union management cooperation, and industrial engineering as viewed by a union industrial engineer.

Gas Operating Revenues Up Over Past Year

Operating revenues of natural-gas companies reporting to the Federal Power Commission amounted to $58,301,425 in June, an increase of 15.9 per cent over the same month a year ago.

Gas sales to ultimate consumers in June 1948 were 113,871,000,000 cu. ft., a gain of 11.2 per cent over June 1947. Sales to residential consumers increased 4.3 per cent and to commercial and industrial consumers 5.6 per cent and 12.3 per cent, respectively. Revenues from sales to ultimate consumers increased 9.8 per cent and amounted to $30,878,168. Revenues from residential and commercial consumers were up 5.2 per cent and 6.2 per cent, respectively. Revenues from industrial consumers were up 14.4 per cent.

For the 12-month period ending June 30, 1948, gas operating revenues totaled $785,075,484, an increase of 11.4 per cent over the total reported for the same period a year previous.

Gas utility operating income for June 1948 amounted to $7,952,367, a gain of 19.4 per cent over that reported for the same period a year ago.

Natural-Gas Sales Show Gain of 4.8 Per Cent

Natural-gas sales of the gas-utility industry to ultimate consumers in July totaled 1,804,368,000 therms, an increase of 4.8 per cent over the same month a year ago, according to a report by the American Gas Association. On a 12-month basis ending July 31, 1948, sales of natural gas totaled 27,239,467,000 therms, a gain of 11.3 per cent over the same period a year previous.

Total gas sales (including natural, manufactured, and mixed gas) for July amounted to 2,012,096,000 therms, an increase of 3.4 per cent over the comparable month in 1947. For the 12 months ending July 31 total sales of gas amounted to 30,948,619,000 therms, a gain of 9.2 per cent over the year previous.

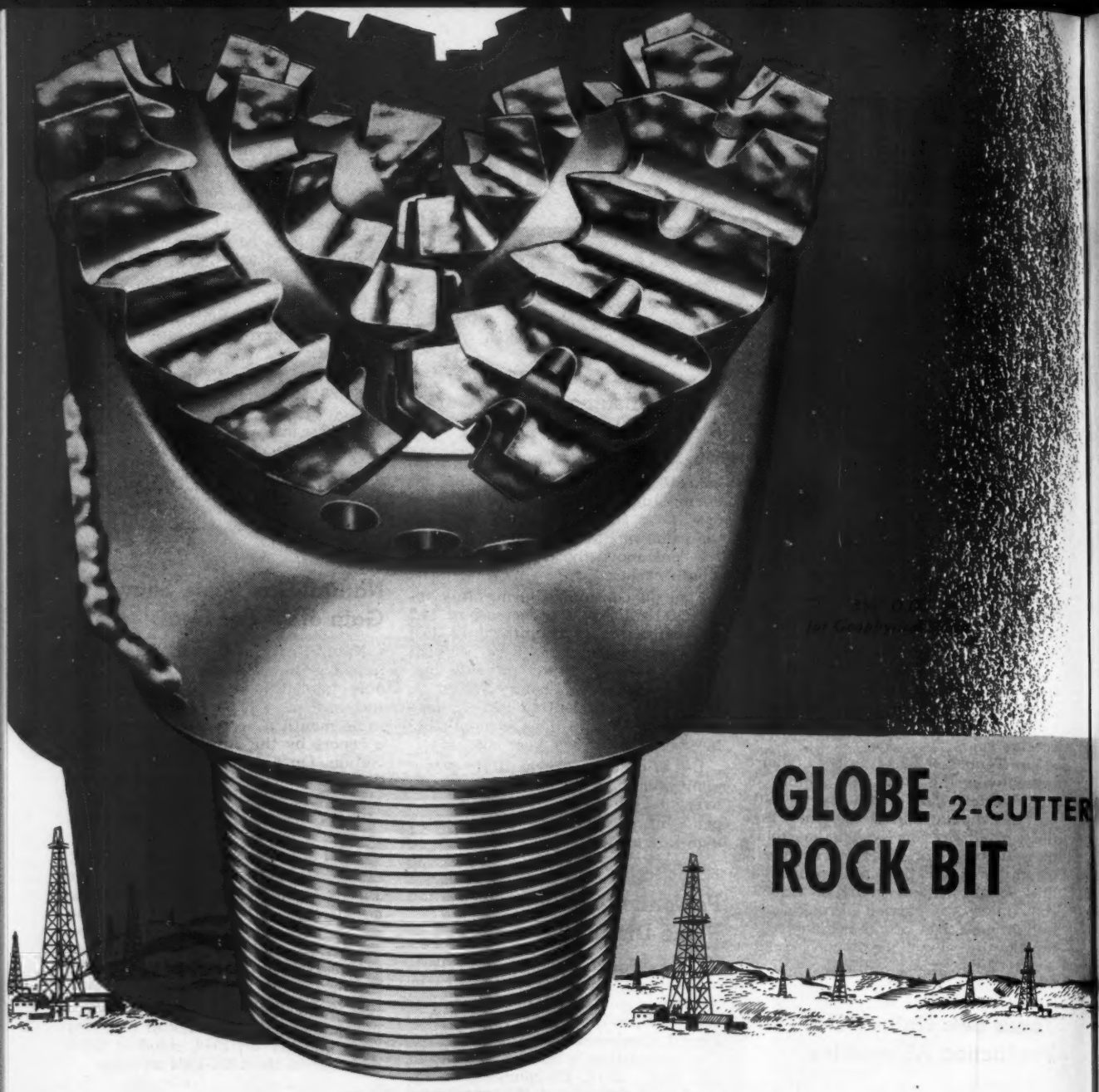
The Association's index of total gas sales on July 31, 1948, stood at 205.6 per cent of the 1935-1939 average.

Natural Gasoline

Gulf Begins Work on Eunice, N. M., Plant

Construction has begun on the Gulf Oil Corp. gasoline and liquid petroleum gas plant near Eunice, N. M. The plant will have an initial capacity of 30,000,000 cu. ft. of natural gas daily which will be increased later to 50,000,000 cu. ft. daily.

Gulf will draw its gas supply for the plant from the Eunice pool where the company owns extensive acreage. Completion of the plant is scheduled for about the middle of next year.



The New *GEOPHYSICAL* Sensation!

The Globe 2-Cutter Rock Bit has revolutionized geophysical work... it out digs, out lasts, and out performs any other bit *or your money back.*

Why take a chance when you can get the best?... use a GLOBE

GLOBE ADVANCED ENGINEERING...

GLOBE OIL TOOLS COMPANY *Builder of Champions*

General Offices and Plant: LOS NIETOS, CALIFORNIA
Branches In VENTURA, BAKERSFIELD and SANTA MARIA, CALIFORNIA

HAKE TOOL COMPANY, Representative for Southern Texas, Louisiana and Mississippi, Houston, Texas and New Iberia, Louisiana • GLOBE OIL TOOLS (CANADA) COMPANY, Black Diamond, Alberta, Canada • T-P TOOL COMPANY, Cody, Wyoming and Rangely, Colorado • MANUFACTURERS WAREHOUSE COMPANY, 1531 West Main Street, Oklahoma City, Oklahoma • H. D. "Spec" DONHAM, Box 1904, Odessa, Texas

Among the

Drilling Contractors

Mohawk Opening New Pool

Mohawk Drilling Co. is opening a Skinner sand pool south of Coyle field in extreme eastern Logan County, Oklahoma, at the 1 Amelia Marshall, in SE SE SE 14-17n-1e. The test, started as a Wilcox sand venture, was taken to a total depth of 5,160 ft. in that formation and then plugged back to 4,560 ft. where the 5½-in. casing was set.

The Skinner sand was found at 4,490 to 4,540 ft. and was perforated at 4,490 to 4,502 ft., for a 30-bbl. fill-up. Production was estimated at from 100 to 250 bbl. of oil per day, following acid treatment. Casing pressure stood at 650 lb., as crew installed tanks.

The Marshall test is across the Cimarron River from production in the Coyle field, which is situated in Payne County, and is about a mile north of the one-well South Coyle pool opened by Gulf Oil last year.

B & R Drilling Co. and Wilcox Oil Co. have set 186 ft. of 8-in. surface pipe at the 1 Engle, SW NW SE 1-9-24, to test a block of approximately 3,000 acres in central Graham County, Kansas. The location is 6 miles southwest of Gettysburg pool, 14 miles west of Morel pool, and 9 miles southwest of Hill City.

James Burton is drilling contractor on the Chester Anderson 1 Paul Konecke, in NW SE SW 27-2n-13w, Allegan County, Michigan.

Olson Drilling Co. has been awarded drilling contract on the Carter Oil Co. 1 Frankenberg Unit, in C NE SE 6-4n-3w, Garvin County, Oklahoma. Well is south offset to 1 R. E. Frankenberg.

J. P. Terry has contract to redrill Holly Oil Co.'s No. 3 well in the Huntington Beach field, California.

Clyde B. Miller will drill the P. K. Degenther 4 U. S. Government, in NE SE SE 11-3n-14w, Allegan County, Michigan.

Milt Crow Drilling Co. has the contract for the Carter Oil Co. 1 Bull, in C SW SW 3-18s-17w, in the new Cairo field of Union County, South Arkansas.

Olson Drilling Co. 1 Murphy, wildcat, in NW NW SW 12-5n-5w, southwest of Ringling in Jefferson County, Oklahoma, was dry and abandoned

Olson Drilling Co. crew on rig No. 98, drilling for Carter Oil Co. at the R. E. Frankenburg, Lindsay, Okla. Shown are: J. P. Hadnot; Kenneth P. Bates; Jesse Harmon; W. F. Lanier, driller; Orville S. Reed, and Pete Wiederkehr, tool pusher

PENBERTHY

"REFLEX"

WATER GAGE SET

For oil field, locomotive type and marine boilers. Water shows black — steam shows white; the water level is unmistakable. U-Bolt construction is strongest and simplest to service. Glass replaced by simply removing nuts on face of gage . . . unnecessary to work between gage and boiler. Conforms with A.S.M.E., Federal and State requirements when used for pressures specified by their respective codes.

This is one of the complete line of Penberthy gages that meet every liquid level gage requirement.

PENBERTHY INJECTOR CO.

DETROIT, MICH. Canadian Plant WINDSOR, ONTARIO

USE 'BESTOLIFE IT'S BETTER

'BESTOLIFE—the Lead Seal Joint Compound used successfully in the Drilling and Refining Industries for years—is immediately available through more than 100 distributors in the U.S.A. Your nearest supply house field store probably has 'BESTOLIFE in stock for immediate delivery. Use 'BESTOLIFE—it's BETTER!

EXPORT: THE NATIONAL SUPPLY CORP., 30 ROCKEFELLER PLAZA, NEW YORK

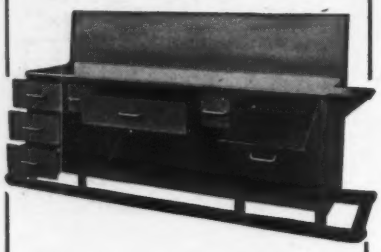
I. H. GRANCELL

1601 EAST NADEAU STREET

LOS ANGELES 21, CALIFORNIA

OWEN

SAVE YOUR TOOLS— LOWER YOUR COSTS



OWEN TYPE "A" WORK BENCHES protect tools and instruments against loss and damage and save valuable time by keeping the tools most often used within quick, easy reach when needed.

Equip your rigs with these all-steel, all-welded, weather-proof benches and watch your tool loss drop and your crew efficiency increase. Full particulars will be furnished upon request.

SOLD THROUGH ALL SUPPLY STORES

OWEN TOOL COMPANY
4718 West 18th Street V 2-4341
HOUSTON 7 TEXAS

VARCO

DRILL COLLAR CLAMP

A safety device as well as a universal set of slips. No drill collar slips needed if used with heavy plate atop the master bushing. Movable slip inserts with VARCO buttons, complete within itself; no extra parts needed. For drill collar sizes 4½" to 8" inc. Chrome alloy heat treated steel. Write for complete data.

Abegg & Reinhold Co.

2533 EAST 26TH STREET
LOS ANGELES 11, CALIFORNIA
1502 Maury St., Houston 10
418 S.E. 29th St., Oklahoma City 9
356 No. Wolcott St., Casper, Wyo.
Export: 617 So. Olive St.
Los Angeles 14, Calif.

at 6,813 ft., total depth. Olson 1 Cities Service-Johnson, in C NW SE 4-5n-11e, north of Hill Top gas pool, in Hughes County, Oklahoma, is drilling at 4,891 ft.

Cook Drilling Co. is contractor on the Lloyd C. Green 2 Clawson, in SW NW SE 30-3n-12w, Allegan County, Michigan.

Anderson-Carey Drilling Co. 2 Ogle, in NE NW SE 32-13n-1e, Oklahoma County, Oklahoma, pumped 113 bbl. of oil in 24 hours; total depth 4,883 ft. with pipe set at 4,859 ft. No. 3 Ogle, in NE SE SE 32-13n-1e, was drilling below 4,705 ft.

Woods Drilling Co. has spotted the 2 Crystal, in NE SW SE 33-17n-1e, Logan County, Oklahoma, in Northwest Iconium pool, near the 1 Crystal.

W. Spencer Cook will drill the Ohio Oil Co. 1 Charles F. Hautau, in SE NE NE 2-1n-15w, Allegan County, Michigan.

Union Drilling Co., of Calgary, has contract for a deep test to be drilled in LSD 12, 15-50-2w4, in the Blackfoot extension of Lloydminster field. The test, which will be carried into the Devonian limestone is the first of its kind in this area, and is being jointly financed by 10 companies interested in the field.

Harbar Drilling Co. and J. M. Huber Corp. have staked location for the 1 Coen, SE SE SE 15-23-14, 7 miles northwest of St. John townsite pool in western Stafford County, Kansas. Deep Rock Oil Corp., Gulf Oil Corp., and Sinclair Prairie Oil Co. are supporting.

Goll, Graves & Mechling, Inc., has been awarded drilling contract on the Frank E. Roush, Raymond M. Whyte, & Wm. M. Stewart 1 Anthony and Grace A. Kaczmarak, in NE NE SW 11-17n-3e, Bay County, Michigan.

Helmerich & Payne, Inc., has contract for Stanolind Oil & Gas Co. and California Co. 1 State, wildcat in NE NE SW SW 36-9n-17w, and are preparing to drill. Location is 6 miles southeast of Cordell in Washita County, Oklahoma.

Aylward Drilling Co., Sohio Petroleum Co., and Nate Appleman have run casing to test the Arbuckle at the 1 Metz, SW SW SE 13-11-19, 2 miles northwest of Riverview pool in northern Ellis County, Kansas, after recovering 38 ft. of oil-cut mud in a 1-hour drill-stem test taken from 3,467-79 ft. Five-inch casing was set at 3,463 ft.

Taggart Drilling Co. is contractor on the Michigan Gas Storage Co. 6

"You can always Break the joint"

Prepared especially for proper lubrication and protection of Tool Joint threads. Jimmie Gray's 500 Ton Tool Joint Compound* prevents washouts and galling . . . makes breaking-out easier . . . withstands highest pressures and is unaffected by heat and moisture.

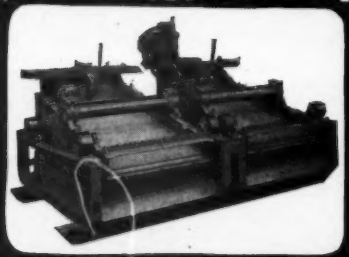
Sold by Supply Stores, Everywhere.

Distributed by

STANDARD OIL SALES CO.

P. O. Box 203 Charter 4-5648
Houston 1, Texas
*Trade Mark Reg. U. S. Pat. Off.

OVERSTROM
VIBRATING
ROTARY MUD SCREENS



OVERSTROM'S 2'x 4' and 3'x 4' dual and single unit mud screens, mainly used for shallow and medium drilling operations, have earned and won the acceptance of drilling operators throughout the world. The proven product of 25 years experience in designing vibrating screen equipment.

Also available in the 4½'x 5' heavy duty type for deep drilling operations.

Write to Oil Equipment Division for bulletin MS-20-B or see Composite Catalog.

OVERSTROM & SONS
ENGINEERS AND MANUFACTURERS
2213 West Mission Road
Alhambra, California U. S. A.

INCREASE PRODUCTION
Clean Out With
MILLER

SAND PUMPS

Pump O. D. sizes are: 2½, 3, 3½, 4¼, 5, 5½ and 7 inches. 20, 25 and 30 ft. length. Strong bail welded to heavy seamless steel tube. Heavy grooved plunger assures liquid seal. Wire line direct connected to plunger for great suction.

MILLER BAILERS

Bailer O. D. sizes are: 3, 3½, 4¼, 5 and 5½ inches. 20, 25 and 30 ft. length.

Miller Sand Pump Co.
General Office Box 4516
1524 SE 29th St.
OKLAHOMA CITY 9, OKLA.
EXPORT OFFICE
30 Rockefeller Plaza
NEW YORK CITY 20, N. Y.
See Composite Catalog Page 2426

Standco
NO-SMOKE
STANDCO BRAKE LINING
Stands the gaff and gets the job done without scoring brake rims. See pages 3608-3613, Composite Catalog.
Standco Brake Lining Co.
HOUSTON

For QUICK DELIVERY
Gears of all types

- *Quality Controlled*
- *Strength*
- *Quiet Operation*

We make gears of all types from your choice of materials. Large or small orders are given prompt attention.

J. W. MATHEY MACHINE WORKS Inc.
Phone 2-9375
114 So. Elgin Tulsa, Okla.

M.G.S. Co., in C NW NW 6-19n-6w, Clare County, Michigan.

Summit Drilling Corp. is circulating for samples at 4,697 ft. in what is believed to be the Wilcox sand at 1 Hickman, SW SW NE 13-18n-2e, south of Stillwater, Okla., and northeast of the Callery & Hurt well in 28-18n-2e which has shown the earmarks of a producer. The Summit wildcat found the Mississippi lime at 3,368 ft., the Woodford at 4,509, and the Sylvan at 4,550 ft.

Leonard Drilling Co. will drill on contract the Leonard Oil, Inc., and Wilson Petroleum Co. 1 Catherine Wacha, in NE SE SE 14-8n-7w, Ionia County, Michigan.

Douglas H. Graham, Long Beach, Calif., drilling contractor, has been elected treasurer of the Children's Home Society of California.

Meredith & Higginbotham is contractor on the Talbot Oil Co. 1 Conn Melland, in C W½ SE NE 17-25n-4w, Crawford County, Michigan.

Grayhill Drilling Co. has the contract for the wildcat, 1 Kapp, in NW SW SE 8-16n-1e, east of South Langston pool in Logan County, Oklahoma.

Mercury Drilling Co. is starting the 1 Hattie Jordan, in NW NW NW 15-15n-1e, in East Evansville pool of Logan County, Oklahoma.

Gordon Drilling Co. will drill the Gulf Refining Co. 1 O. G. Jensen, in NE SE SE 1-16n-18w, Oceana County, Michigan.

Tober & Coleman have completed the Stanolind Oil & Gas Co. 11 Goodwin, in SW NW SW 2-1s-4w in the Sholem Alechem sector of Stephens County, Oklahoma, after pumping 213 bbl. of oil in 24 hours. It was completed at 5,473 ft. but plugged back to 5,270 ft.

Big Chief Drilling Co. 1 Castell in NE NW SW 12-20n-4w, in Garfield County, Oklahoma, was drilling below 4,213 ft.

Summit Drilling Corp. 1 Hickman, wildcat in SW SW NE 13-18n-2e, south of Stillwater, Okla., in Payne County, had the first Wilcox sand at 4,702 ft., lower Wilcox at 4,731 ft., and dry white sand at 4,705 ft., and has shut down waiting orders.

Goldsmith & Perkins have completed the Stanolind Oil & Gas Co. 3 Moss, in NE SW SW 35-1n-4w, in the Sholem Alechem sector of Stephens County, Oklahoma. The well was completed after pumping 287 bbl. of oil in 24 hours. Hole was bottomed at 5,409 ft. and plugged back to 5,369 ft.

LINE SCALES

(Above) Super 500,000-lb. capacity, 14" dial. (Below), Packer Special, Capacity 40,000 lbs., 6" dial. 18 other models for every drilling, well servicing, or work-over need.

20 MODELS to choose from

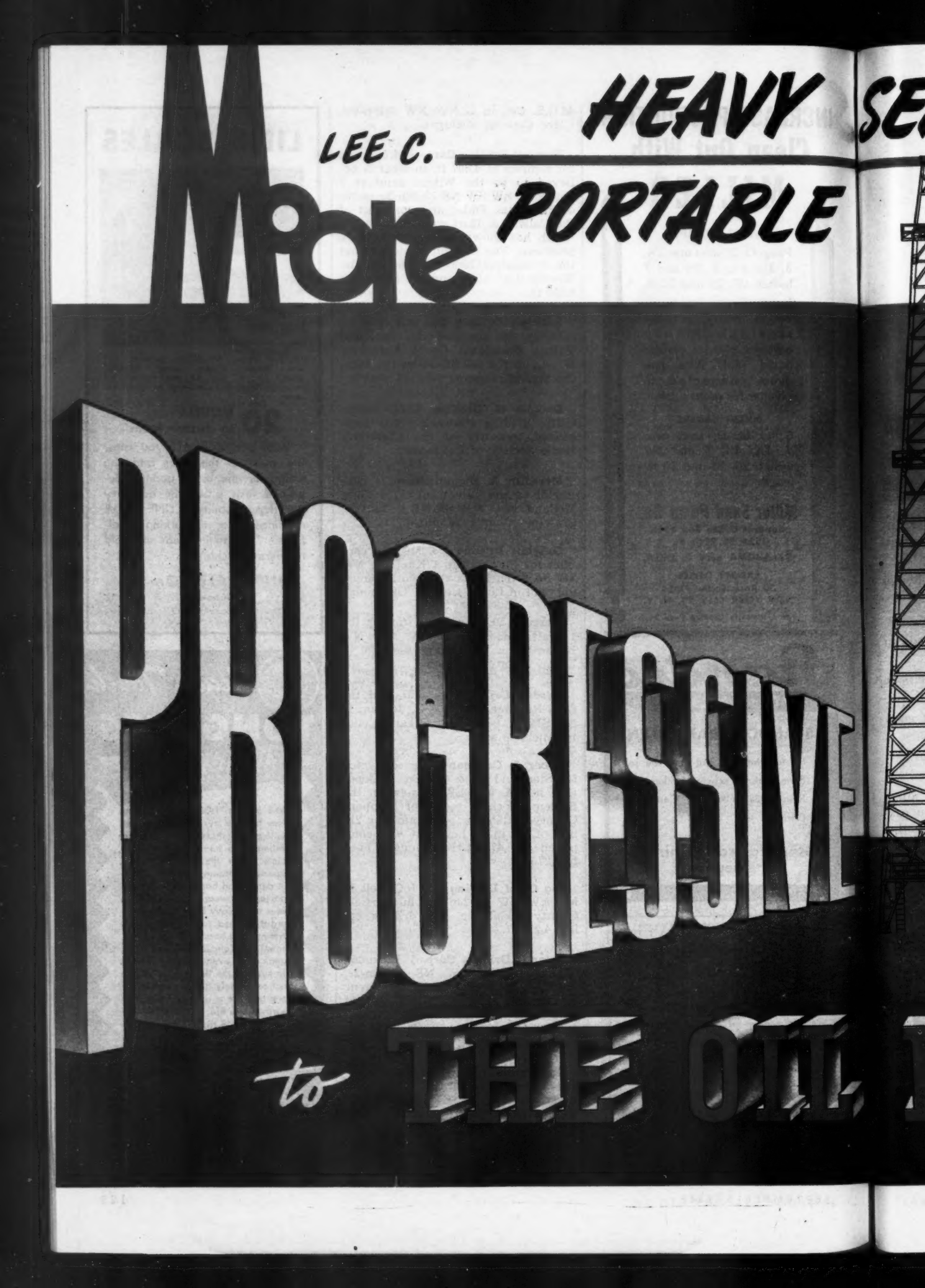
With a LINE SCALE you know the pull on the line, and the weight on the bit in pounds. Repeated tests prove the accuracy and dependability of LINE SCALE readings under all working conditions . . . even in areas of rapid temperature changes.

LINE SCALE CO., Inc.
Box 4245 Oklahoma City Ph. 6-1765
Gulf Coast Representative: Hiram Wheeler Box 8043, Houston 4, Texas — J2-1107

Tiger Tooth
TONG DIES

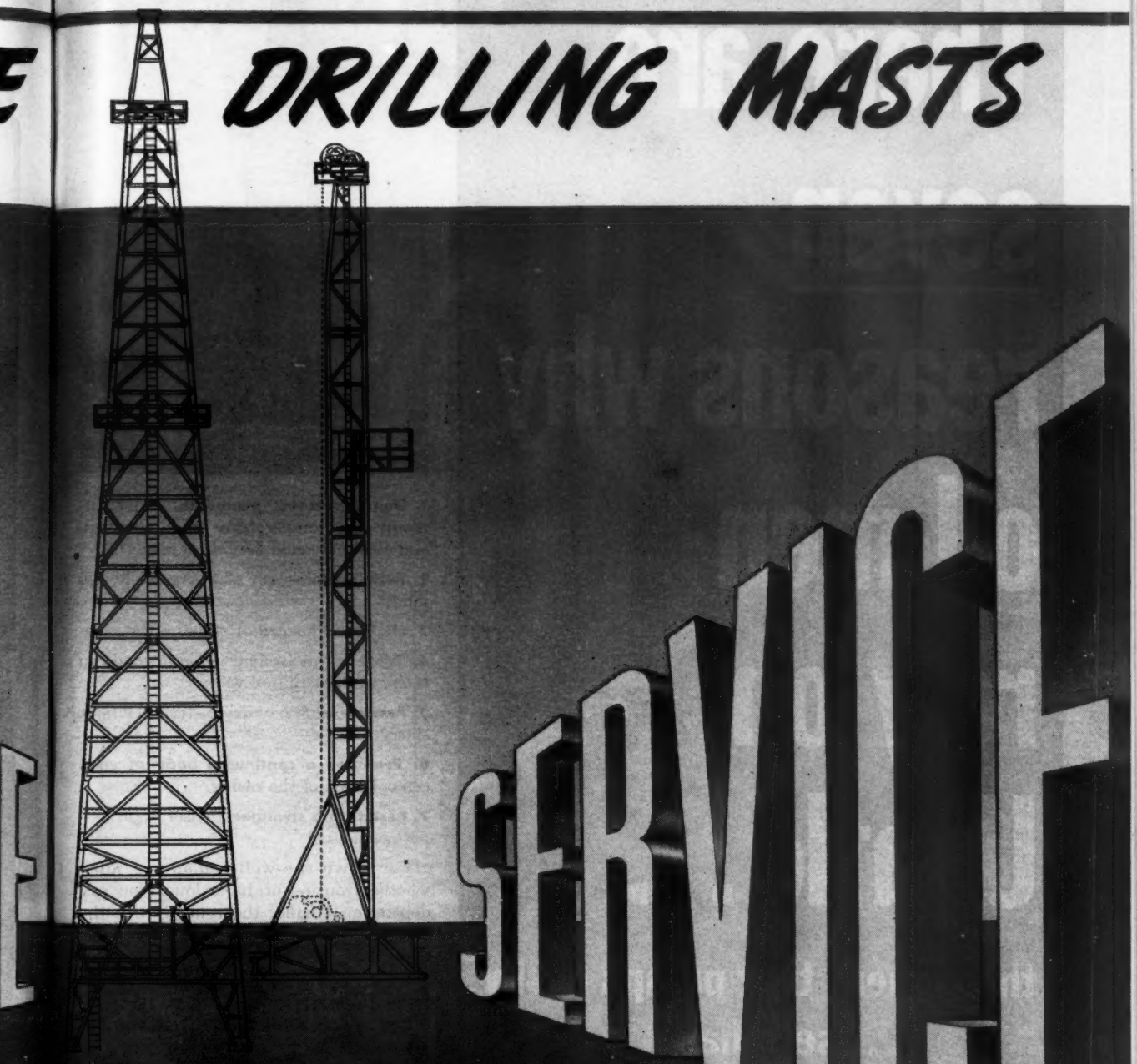
Web Wilson "TIGER TOOTH" Tong Dies have a pyramidal, pointed tooth pattern that assures a positive, "biting" grip on the hardest tool-joints under the strongest pulls. Especially recommended for flame-hardened and hard metal surfaced tool joints or wear subs. The sloping sides and heavy base of the pyramidal shaped teeth gives extra strength and backing to each tooth. Tiger Tooth Tong Dies will not easily break down even in severe service. They are of the "full-length" design that completely fills die slot in the tong and are reversible to provide extra service life. . ."TIGER TOOTH" Tong Dies will fit all tongs used in the oil fields today—for dependable, economical service, specify WEB WILSON "TIGER TOOTH" TONG DIES.

WEB WILSON
W. W. Wilson Bldg
Huntington Park
California
Oil Tools


LEE C.
Moore
HEAVY
PORTABLE
PROGRESSIVE
to THE OIL

SERIES DERRICKS and

DRILLING MASTS



SERVICE

INDUSTRY

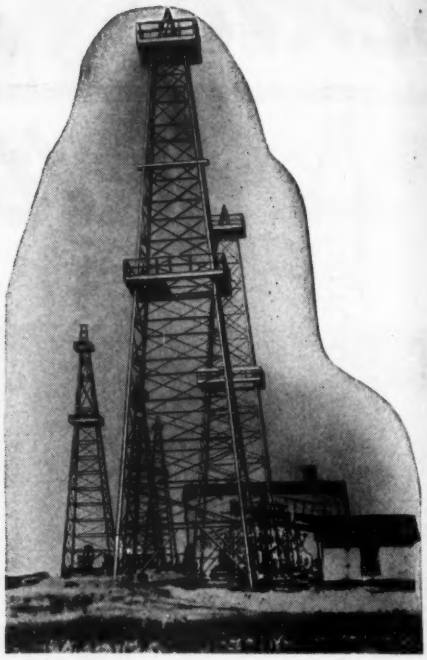
LEE C. MOORE CORPORATION

TULSA • DALLAS • HOUSTON • MIDLAND • SHREVEPORT • WICHITA • CENTRALIA • PITTSBURGH

Export Office — 30 Church Street, New York 7, N. Y.

There are seven reasons why oil men rely on Unaflo...

the cement that pumps easily ...sets hard



1. Unaflo remains pumpable under different hole temperatures and pressures, and after extended periods of rest.

2. Permits placement of slurry while still fluid.

3. Minimizes hazard of sticking the pipe.

4. Protects investment already made in tools, equipment and well.

5. Permits using a heavy instead of a light slurry.

6. Produces a continuous body of good cement back of the casing.

7. Results in a stronger, denser, more impermeable seal.

For down-the-well cementing jobs, whether routine or hazardous, you can depend on Unaflo, the cement with the delayed, postponed, *retarded* set. This easy-flowing cement stays fluid and pumpable throughout the entire period of retardation—then sets normally to provide a hard, dense seal. Send for further information.

OG-U-88

Waco; Kansas City; Birmingham; Chicago; New York. Export Distributors: United States Steel Export Company, New York.

UNIVERSAL ATLAS CEMENT COMPANY

OIL-FIELD CEMENTS

Unaflo Retarded Oil-Well Cement
Resistant to Sulfate Waters
Atlas Portland Cement—Type I
Atlas Portland Cement—Type II
Resistant to Sulfate Waters
Atlas High-Early Cement—Type III

"THE THEATRE GUILD ON THE AIR" — *Sponsored by U. S. Steel Subsidiaries—Sunday Evenings—September to June—ABC Network*

Exploration and Drilling

California Sees Oil Prospects in New Areas

RECENT discoveries in California have focused attention on the fact that there are still large areas in the state unpenetrated by the exploratory drill which may have the capacity to produce oil in considerable quantities. While it is quite likely that the majority of significant discoveries of the future will be made in the three long-known sedimentary regions, the San Joaquin Valley, the Los Angeles Basin and the Coastal Region, by continued exploration, reworking and just plain hard plugging, recent discoveries in the Cuyama Valley, the Salinas Valley and beneath the tidelands off Santa Barbara County have brought into the spotlight at least two large regional trends which may contain many important oil accumulations.

First among the areas at present is the trend of sedimentary basins extending northwesterly from the Cuyama Valley at the south to the Salinas Valley in the north. This trend roughly parallels the trend of oil fields in the San Joaquin Valley. First discovery along this trend was made by The Texas Co. late last year at San Ardo in the Salinas Valley. Wells so far in this field have been small and oil has been heavy, roughly 12° gravity. The Texas Co. wells have been averaging around 65 bbl. daily on initial production tests, but a combination consisting of Jergins Oil Co. and North American Consolidated Oil Co. recently has been completing wells for approximately 200 bbl. daily a short distance to the north. While these discoveries alone do not appear of primary importance, they assume greater significance when considered in the light of recent discoveries made by Richfield Oil Corp. in the Cuyama Valley. In this latter area Richfield has made two discoveries both of which are capable of yielding wells with initial productions as high as 6,000 bbl. daily and which are reputed to be the largest strikes in California during the past 10 years. Both the Salinas Valley and the Cuyama Valley have long been considered as areas unfavorable from the standpoint of containing commercial accumulations of oil, and the fact that no oil had been found by exploratory drilling in either area has practically condemned a long narrow trend of basins lying between them and containing large sections of marine deposits. The finding of oil at San Ardo and in the Cuyama Valley, however, has shed new light on these basins and they are now considered as very favorable oil prospects. Exploration is already under way along the trend and the tempo of drilling is expected to pick up rapidly with many important oil discoveries being made in the coming years.

Second of the regional trends occupying the exploration spotlight in California at the present time is the sedimentary deposits lying beneath the ocean off the coastline of Santa Barbara County. Oil production from beneath the tidelands in Elwood, Capitan and Goleta fields indicated that oil accumulations may extend well out into the ocean and from the trend of these fields it appears that the ocean off the Santa Barbara County coast is the most probable spot to find tidelands fields.

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

SOUTH LOUISIANA.—The third oil well from one drilling platform in the Gulf of Mexico has been completed by Kerr-McGee Oil Industries, Inc., in the Block 32 field of Terrebonne Parish. This well also opened a new producing zone for the field. It is the 3-State, Block 32, Lease 754, which was drilled to a total depth of 3,398 ft., and flowed an initial production of 960 bbl. per day through a ½-in. choke. Heavy storms have curtailed further operations in the Gulf during the past few days.

ROCKY MOUNTAINS.—Phillips Petroleum Co. found Lakota sand oil in its 1 Unit, South Cole Creek wildcat in Natrona County, Wyoming, with the well estimated good for 70 bbl. of oil per hour. At Pine Mountain, U. S. Oil & Development Co. reports a well capable of producing 150 bbl. of oil daily from the Tensleep at 1,810 ft. Seaboard Oil Co.'s new pay discovery at Silver Tip, Park County, flowed 694 bbl. of 45°-gravity oil per day, and Pacific Western & National Associated are continuing tests at their Bridge Creek wildcat in Niobrara County with the well making approximately 60 bbl. of oil per day from the Dakota.

WEST TEXAS.—The Benedum field of Upton County received its third and fourth completions this week, confirming production to the southeast and northeast of the discovery. Plymouth Oil Co. 1 J. B. Wallace, northeast offset, was the third to complete, flowing a daily potential of 520 bbl. of 59°-gravity oil, with no water, from open hole between 11,480-500 ft. It was not acidized. Plymouth's 1 Taylor & Sadler kicked off after acidizing and flowed at the rate of 12 bbl. of oil an hour. The Sadler well entered the Ellenburger at 11,281 ft., 260 ft. lower than the field opener, and the 1 Wallace entered the Ellenburger at 11,125 ft., 101 ft. lower than the discovery.

NORTH TEXAS.—Kingwood Oil Co. 1 Holman extended flush production 2,000 ft. west on the north end of the Chico Bend conglomerate field of Wise County, flowing 649 bbl. of oil in 24 hours, for the largest potential in the field. Cities Service 1 Terrell, in the northwest extension area, flowed 630 bbl. of oil daily. The field now has 10 completed wells in the conglomerate.

INDIANA.—Sullivan County has the state's biggest Devonian well at the F. B. Cline 1 Pittman, 30-9n-8w, which flowed 100 bbl. per hour for the first 2 hours of testing after perforating at 2,038-43 ft.

MISSISSIPPI

State Has Four Wildcat Starts

JACKSON.—In La Grange field, Adams County, Kemp-Glister-Vaughey-Hodge 3 V. T. Craig Estate ran several tests in the Sparta sand with no success and operators went back to the Wilcox producing horizon to make completion. The operators feel that the Sparta zone will make a commercial well and they are awaiting with interest the outcome of Kingwood Oil Co. 1 Stanton, which is located approximately 1,350 ft. north and slightly west of No. 3 Craig Estate. Kingwood plans to core and drill-stem test the Sparta zone in open hole.

In Cranfield field of Adams County, The California Co. 1 Cranfield Unit 5, Tract 1, 48-7n-1w, was completed for an initial production of 378 bbl. of 52.4°-gravity condensate plus 6,785,000 cu. ft. of gas per day, through a ⅜-in. choke. Tubing pressure 2,860 psi. Production is through perforations at 10,212-256 ft., and 10,276-290 ft. Total depth is 10,292 ft.

Superior Oil Co. 1 Polly Griffith (Gas Unit 32) 17-9n-18w, in Gwinville field, Jeff Davis County, flowed 1,863,000 cu. ft. gas plus 12 bbl. of condensate per day through a 20/64-in. choke, with tubing pressure of 2,750 psi., and gravity 53°. Total depth 8,420 ft., with perforations at 8,200-10 ft.

Graham & Lewis 2 W. H. Husband, 29-1n-13e, in Heidelberg field-East, Jasper County, flowed 179 bbl. of 24°-gravity oil per day through 12/64-in. choke, through perforations in the Tuscaloosa zone, topped at 4,880 ft. Total depth is 5,010 ft.

Four wildcat starts were reported in Mississippi, 1 east in George, Madison, Warren and Washington counties. Development locations were 2 in Baxterville field; 1 each in Eucutta, Heidelberg-West, LaGrange, Langsdale, Mallalieu and Yellow Creek fields. The 6 wildcats completed were dry, 1 each in Attala, Copiah, Issaquena, Warren, Wayne, and Yazoo counties.

MISSISSIPPI WILDCAT FAILURES

Attala County: D. S. Weaver et al 1 M. C. Rutherford, C SW NE 1-12n-5e, dry, TD 4,512 ft.

Copiah County: The California Co. 1 V. E. Weeks, NW/c NE NW 9-9n-5e, dry, TD 10,402 ft.

Issaquena County: Murphy-Sun 2 Tri-County Hunting & Fishing Club, 17-9n-8w.

Warren County: Sun Oil Co. 1 State of Mississippi, 16-18n-2e, dry, TD 5,010 ft.

Wayne County: Southeastern Drlg. Co. & I. P. LaRue 1 Lee Beard, 18-9n-6w, dry, TD 6,616 ft.

Yazoo County: Lyle Cashion, Inc., 1 Hardwick-McGraw, NE SW 12-11n-2w, dry, TD 7,713 ft.

TENNESSEE WILDCAT FAILURE (PREVIOUS COMPLETION)

McNairy County: Stephens 1 Petree, 1,000 ft. NE Michie, dry, TD 5,000 ft., elev. 585 ft.

FLORIDA WILDCAT FAILURE

Osceola County: Hunt Oil Co. 2-A Peavy-Wilson Lumber Co., SW SE 27-25s-34e, dry, TD 5,856 ft.

RUGGEDNESS REAPS REPUTATION

. . . As proved throughout Acme's 48-years of specializing in Trustworthy Cable Tools . . . In Rope Sockets, for instance, whose EXTRA rugged character has made them the preference of discriminating Drillers through 2-generations.

From billet to finished Rope Socket, every factor for maximum field service is safeguarded: By rigid specifications and analyses of premium-grade, CORRECT steels; heat-treatment process, electro-automatically controlled; and, "quality-comes-first" craftsmanship.

Every Rope Socket MUST uphold the Acme tradition —for greater stamina and performance . . . Factors which mean less cost per foot of hole drilled . . . Factors which can not, in cable tool manufacture, be subjected to "stop watch" curbs.

Acme's Prosser Swivel Socket (Fig. 115) is designed for wire cable use . . . As are our Babcock (stiff) and Burns Swivel. (Other types for manila cable.) All made to API specifications — unless ordered special.

See panel (right) for other Acme Drilling Tools — for that EXTRA service you prefer.

Fig. 115
Acme Prosser Swivel Socket

★ See Acme's new Catalog insert in Composite Catalog (Vol. 1) — or write us TODAY for full information on any Cable Tool needs. ★

A—Wire Line Clamp, 12"
B—Burns Swivel Socket
C—Drilling Jar
D—Drilling Stem
E—Bailer
F—Drilling Bit

Acme Fishing Tool Co.
PARKERSBURG, W. VA.
Export Office: 19 Rector St., New York 6, N. Y.
ACME DRILLING & FISHING TOOLS
Since 1900

SOUTH LOUISIANA

Magnolia Gets Dry-Gas Well in Iberia Parish

NEW ORLEANS.—In the Gulf of Mexico approximately 15 miles off Marsh Island, Iberia Parish, Magnolia Petroleum Co. has hit a flow of dry gas. The well, on State-Lease Block 45, flowed at the rate of 447,000 cu. ft. of gas per day on a 1-hour test, using a 12/64-in. choke and tubing pressure was 438 psi. Production is through perforations at 11,386-88 ft. Operators are still testing and plan to test later for oil at higher levels. Total depth is 13,636 ft.

Kerr-McGee Oil Industries, Inc., 3 State, Block 32, Lease 754, is the third producer completed from the same drilling platform in Block 32 field of Terrebonne Parish. Total depth is 3,398 ft., and on state potential gage the well flowed 960 bbl. of 25.6°-gravity oil per day through a ½-in. choke. The well also discovered a new producing formation for the field, between 1,758-74 ft. Tubing pressure was 150 psi.

A good saturated sand section showing oil was picked up by Irwin & Hudson 1 Houssiere-Latreille, a wildcat test in the Langley, or Bayou Sarpent area of Jefferson Davis Parish. The sand section was encountered at the 8,900 ft. level; however, operators are drilling ahead to the contract depth of 9,150 ft.

A new pay zone for Good Hope field of St. Charles Parish was opened by Pure Oil Co. 6 GATX, and flowed 298 bbl. of 45.7°-gravity oil per day through a 10/64-in. choke, through perforations at 7,750-72 ft. Flowing pressure on tubing was 1,415 psi., and gas-oil ratio was 805.

There were 18 new locations reported this week, 4 being wildcat starts, 1 each in Beauregard, Calcasieu, Plaquemines and Terrebonne. Two successful exploratory tests were completed opening a new oil pool in Jefferson Parish and a new oil sand for Good Hope field in St. Charles Parish. Two wildcats were dry, 1 each in Cameron and Jefferson parishes.

SOUTH LOUISIANA SUCCESSFUL WILDCATS

Jefferson Parish: New oil pool—Humble Oil & Refining Co. 1 State Lease 801, Block 10, Grand Isle area, in State Lease 801, 41,602 ft. S 20 deg. 40 sec. E from

Cementrol

. . . PROTECTS AND PREVENTS CEMENT CONTAMINATION OF EXPOSED FORMATIONS BELOW THE CASING SEAT

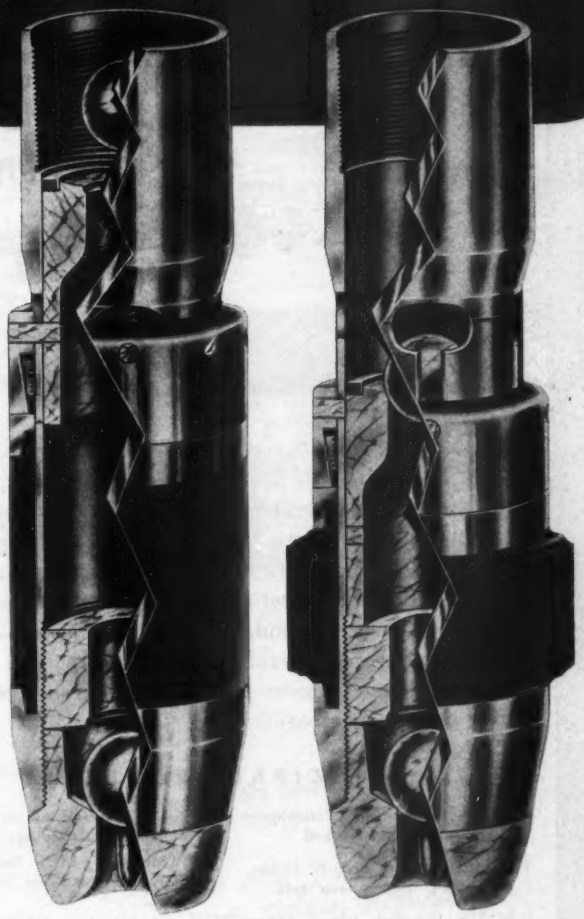
Cementrol is the tool to use when it is imperative that no cement pass below the casing seat. It was developed specifically for this purpose, and is now being effectively used in wells of all depths.

Cementrol is "made to order" for water-flooding operations where it is so necessary to keep the open hole of input wells free of pore-clogging contamination.

In addition to preventing contamination of the formation, Cementrol, as the packer expands under hydraulic pressure, provides a positive centering of the casing at the shoe, and assures an even flow of cement that is discharged through the side ports.

For complete information on the operation, and the various applications of Cementrol equipment, please refer to your Larkin catalog . . . or call your nearby Larkin representative.

Cementrol is stocked by all leading supply stores.



Cementrol in running-in position . . . serving only as a float shoe.

Cementrol after being expanded by pump pressure. Note external packer, internal bakelite bridge, and exposed side cementing ports.

LARKIN

. . . Through Your Supply Store

LARKIN PACKER CO., INC.

ST. LOUIS, MO.

USCGS "Barataria Lighthouse 1911." TD 8,951 ft. in sidetracked hole, top sand 8,640 ft., perf. 8,640-65 ft. IP: 840 bbl. oil per day through a ¼-in. choke, GOR 575, gravity 30.9°, no water. Top salt in first hole 7,607 ft.

St. Charles Parish: New oil sand Good Hope field—Pure Oil Co. 6 GATX, 7-12s-8e, TD 9,450 ft., top sand 7,750 ft., perf. 7,750-72 ft. IP: 298 bbl. oil per day through 10/64-in. choke, GOR 805, gravity 45.7°, no water.

SOUTH LOUISIANA WILDCAT FAILURES

Cameron Parish: Stanolind O. & G. Co. 1 Miami Corp., 4-15s-3w, 2 mi. S of Pecan Lake prodn., dry, TD 12,500 ft.

Jefferson Parish: The Texas Co. 4 State-Barataria Bay, Lse. 356, Queen Bess Island area, in Barataria Bay, Twp. 20s-25e, dry, TD 16,106 ft. Deepest test in Louisiana.

SOUTHWEST TEXAS

Hidalgo County Well Gages 8½ Bbl. Per Hour

CORPUS CHRISTI.—South of Lacy field in Hidalgo County, Thomas O. Payne et al 1 D. J. Schwarz, wildcat, gaged 8½ bbl. of clean 45.3°-gravity oil per hour through an 11/64-in. choke with 400 psi. pressure on tubing and 1,400 psi. casing pressure, through perforations at 7,562-66 ft. Operators are preparing to run potential gage. This is believed to be a flank well on the big Lacy structure and possibly at water-oil contact.

Hiawatha Oil & Gas Co. 2 Atlee Parr, wildcat southeast of Benavides field, Duval County, made a recovery of oil and salt water on a drill-stem test and is drilling ahead below 5,080 ft. On test from 5,025-30 ft., using ¼-in. chokes, recovered 100 ft. of oil and 400 ft. of salt water in 20 minutes, and developed 11 psi. working pressure.

Final gage has been reported for new pool opener in Milam County. Standard Oil Co. of Texas 1 Lucinda Green et al, in W. D. Thompson Survey, Abstract 368, 3 miles west of Gause townsite. The well gaged 30.44 bbl. of oil per day on pump, plus 57.2 per cent water. Total depth is 5,747 ft. and production is through perforations shot in the Edwards lime section from 5,697-5,704 ft.

Magnolia Petroleum Co. is preparing to make an initial test in the deep wildcat exploration 2 miles southwest of Edinburg townsite in Hidalgo County. The 1 Carlson Unit, Block 1, in S. I. McCall subdivision in the northeast corner of Porcion 68, encountered sands showing oil topped at 9,016 ft., gas sands from 10,349-359 ft., show of oil at 10,845-897 ft. and 10,901-10,905 ft. Total depth is 11,246 ft., with 7-in. pipe cemented at 10,610 ft. and 5½-in. liner from 10,401-11,246 ft. Perforations for the test are being shot from 11,190-193 ft.

There were 46 new locations reported for Districts 1 and 4, 9 being wildcat starts, 2 each in Duval, Starr, and 1 each in Calhoun, Gillespie, Jim Wells, San Patricio, and Webb counties. Three successful exploratory tests were completed opening new oil pools, 1 each in Caldwell, Jim Hogg, and Milam counties. Nine wildcats were dry, 2 each in Duval and Starr, and 1 each in Jim Wells, Kleberg, LaSalle, Webb and Williamson counties.

SOUTHWEST TEXAS (DISTRICTS 1 & 4) SUCCESSFUL WILDCATS

Caldwell County: New oil pool—Dave Kelton & Hubert Braselton 1 Charles T. Kelley, in R. B. Jarman Sur., 5 mi. SE of Lockhart, top pay 1,738-2,176 ft., TD 2,520 ft., open hole 1,922-2,070 ft., IP: 149 bbl. oil per day on pump, gravity 40.5°.

Jim Hogg County: New oil pool—King & Daubert 2 E. L. Armstrong, in J. S. Williams Sur. 295, 2 mi. S of Armstrong field, 13 mi. SW of Hebbronville, 6,000 ft. S-SW of No. 1 dry hole. Top pay 3,209 ft., TD 3,215 ft., perf. 3,210-14 ft., IP: 99 bbl. oil per day through 5/16-in. choke, GOR 120, TP 20 psi., CP 320 psi., gravity 27°.

Milam County: New oil pool—Standard Oil Co. of Texas 1 Lucinda Green et al, in W. D. Thompson Sur., A-368, 3 mi. W of Gause & 8 mi. NE of Milano, top pay 5,698 ft., in Edwards lime, TD 5,747 ft., perf. 5,697-5,704 ft., IP: 30 bbl. oil per day on pump, gravity 30°, plus 57.2 per cent water.

SOUTHWEST TEXAS (DISTRICTS 1 & 4) WILDCAT FAILURES

Duval County: J. W. Gorman 1 N. A. Hoffman, in Diego Hinojosa Grant, A-629, 1½ mi. NE of Crestonio, dry, TD 5,030 ft.

Joe C. Palmer 3 Hagist Ranch, in BS&F Sur. 124, 4 mi. N of Eagle Hill field, and 15 mi. N of Freer, dry, TD 2,113 ft.

Jim Wells County: La Gloria Corp. 1 J. Britt Dekle unit, in Sec. 11, R. P. Haldeman Subd., Seeligson Tr., 2½ mi. S-SW from Premont, dry, TD 8,008 ft.

Kleberg County: Rudco O. & G. Co. and Bracken Oil Co. 1 Otto Nollkamper Subd. Unit 1, in Sec. 36, Kleberg Town & Impr. Co., Subd., 4 mi. SE of Kingsville, ¾ mi. E-SE of Stanolind 1 Johnson discovery well at "North Ricardo" field, dry, TD 8,095 ft.

LaSalle County: The Texas Co. 1 The LaSalle Co., in Bland & Nelson Subd. of O'Connor Ranch, Peter McGreal Sur., dry, TD 9,253 ft.

Starr County: Coastal Refineries, Inc., et al 1 Felipe de Pena, in Tr. 172, 3 mi. NW of Sullivan City, dry, TD 6,005 ft.

W. W. Whiteman, Jr., 1 Jennie V. Sanchez et al, in Porcion 74, 12 mi. N-NE of Roma, dry, TD 1,253 ft.

Webb County: Dulaney Oil Co. 2 Maria G. Martin, in Augustin Laurel Sur. 458,

Dependable steel products for your maintenance and production applications . . . available for your steel-buying convenience at twelve conveniently located Ryerson plants. Large stocks plus unequalled steel-service facilities make Ryerson a time-saving source for every steel-from-stock requirement. Because of great demand, all sizes are not always on hand, but we can usually suggest a practical alternate. Call our nearest plant for quick shipment—a few pounds or a carload.

PRINCIPAL PRODUCTS

BARS—Carbon, alloy, stainless—hot rolled, cold finished

STRUCTURALS—I and H beams, channels, angles, tees, zees

PLATES—Including Inland 4-Way Floor Plate

SHEETS—Including Allegheny Stainless

TUBING—Seamless low carbon and stainless, boiler tubes

BUILDING STEELS—Reinforcing bars and accessories, expanded metal

MACHINERY & TOOLS—for metal working

OTHER PRODUCTS—Chain, wire rope, Babbitt metal, etc.

JOSEPH T. RYERSON & SON, INC.

Plants: New York, Boston, Philadelphia, Detroit, Cincinnati, Cleveland, Pittsburgh, Buffalo, Chicago, Milwaukee, St. Louis, Los Angeles

4 mi. S of Oilton, and ⅘ mi. S of Oilton field, dry, TD 1,890 ft.

Williamson County: Puma O. & G. Co., Inc., 1 Rosa Simoik et al, in Pedro Zarza Gr., 7 mi. SE of Granger, dry, TD 2,146 ft.

TEXAS GULF COAST

New Oil Pool Opened In Matagorda County

HOUSTON.—A new oil pool north of Midfield, in Matagorda County, has been opened by Rowan Drilling Co. and Texas Gulf Producing Co. 1 Guy Stovall, in the I&GN Survey. Drilled to a total depth of 8,760 ft., the well flowed 126 bbl. of 37.1°-gravity oil through perforations at 6,364-66 ft., tubing pressure 920 psi., and casing pressure 1,200 psi. and gas-oil ratio 928. The Frio sand was topped at 6,358 ft. Rowan and Texas Gulf have staked their No. 1 Kountze as a southeast offset to the new producer in Section 71, I&GN Survey, Abstract 279. North of the new well, Johnston & Johnston will drill their No. 1 Guy Stovall.

Sam Maceo et al completed the 1 J. F. Richardson in a new sand at South Liberty in Liberty County. Drilled to 4,700 ft., the pay was topped at 4,430 ft., and on completion gage the well flowed 92 bbl. of 36.1°-gravity oil per day through a 7/64-in. choke. Gas-oil ratio 800, and flowing pressure on the tubing at 780 psi. The production string was cemented on bottom of the hole at 4,700 ft. This test is located in the M. G. White Survey, on east flank of the dome.

Great Lakes Carbon Corp. 1 M. C. Oldham, wildcat test ½ mile west of production in West Garwood field of Colorado County, will be completed as a gas producer. Total depth is 10,056 ft., and test is located in the William Paulding Survey.

A new gas-condensate discovery for Liberty County has been completed at William Hebert Hunt Trustee Estate 1 Welch & Silva. Located 2 miles north of the Cottonwood field in the T&NO Survey, this discovery was drilled to a total depth of 8,296 ft., and completed through perforations at 7,908-7,926 ft., flowing 77.5 bbl. of 58°-gravity water-white condensate along with 3,160,000 cu. ft. of gas daily. Flowing pressure on tubing was 2,960 psi., and casing pressure 2,990 psi. Gas-condensate ratio was 40,800.

The 48 new locations reported for Districts 2 & 3 included 10 wildcat starts, 2 in Live Oak, and 1 each in Brazoria, Galveston, Goliad, Gonzales, Jefferson, Orange, Wharton and Wilson counties. Two successful exploratory tests were completed opening a new oil sand in South Liberty pool and a new oil pool in Matagorda County. Eleven wildcats were dry, 2 in Wharton, and 1 each in Bee, Brazoria, Burleson, Chambers, Fort Bend, Harris, Matagorda, Refugio, and Victoria counties.

TEXAS GULF COAST (DISTRICTS 2 & 3) SUCCESSFUL WILDCATS

Liberty County: New oil sand South Liberty pool—Sam Maceo et al 1 J. F. Richardson, in M. G. White Sur., TD 4,700 ft., top sand 4,430 ft., perforated interval not reported. IP: 92 bbl. oil per day through 7/64-in. choke, GOR 800, TP 700 psi., gravity 36.1°, no water.

Matagorda County: New oil pool—Rowan Drlg. Co. and Texas Gulf Producing Co. 1 Guy F. Stovall et al, in I&GN Sur., Sec. 18, A-278, 3 mi. NW of Midfield townsite, approx. 5 mi. N of Midfield production, TD 8,760 ft., top sand 6,358 ft., perf. 6,364-66 ft., IP: 126 bbl. oil per day through a ½-in. choke, GOR 928, TP 920 psi., CP 1,200 psi., gravity 37.1°, no water.

TEXAS GULF COAST (DISTRICTS 2 & 3) WILDCAT FAILURES

Bee County: Rudco O. & G. Co. 1 C. P. Sparkman, in Asa Walker Sur. ¾ mi. NE of Mineral, dry, TD 7,611 ft.

DEPENDABLE

LIGHT & POWER

for Oil Field Service

AIR-COOLED HEAVY-DUTY

ONAN "CK"

ELECTRIC PLANTS

Available in A.C. or D.C. models, conservatively rated at 3,000 watts, built for heavy-duty service but compact and light in weight (only 315 lbs.), Onan CK Electric Plants are replacing bulky, heavier units for drill rigs, well-servicing and other oil field uses. Equipped with convenient carrying frame for easy moving on the job. Driven by the Onan 10 hp, 2-cylinder opposed, air-cooled CK engine with Onan heavy-duty generator direct-connected. Self-rewinding Readi-Pull starter included as standard equipment. Other models available with manual, Readi-Pull or electric starting. Plug-in receptacles. Weather hood, hinged for easy servicing, protects plant.

Models for every oil field job

Lightweight: 500 to 3000 watts

Gas-gaso-powered: 3 to 35KW

Diesel Plants: 2½ to 35KW

Heavy-duty, one and two-cylinder air-cooled models. Two, four and six-cylinder water-cooled models. Gas-gaso-powered: 350 to 35,000 watts. Diesel-powered: 2,500 to 35,000 watts.

Onan PRODUCTS

Write for Folder

D. W. ONAN & SONS INC.

2748 Royalston Ave. Minneapolis 5, Minn.

VIKING ...originators

of the DESIGN THAT MADE ROTARY PUMPS FAMOUS!

Sept. 1948

All Rotary Pump Users, Everywhere.

Gentlemen:

Youre right! Today's market is cluttered with rotary pump manufacturers. For many it is just a sideline.

But with well over a million Viking Rotary Pumps in service today throughout the world, shrewd pump buyers in every field of industry and commerce prove they prefer the pump that is different!

Get the facts!... Write today for complete bulletin

Yours Very Truly,
Viking Pump Company
Cedar Falls, Iowa.

PRODUCTION TOOLS by Baird

THRU YOUR SUPPLY STORE

BALL & SEAT ASSEMBLIES —
"Double Seal" or Single Seal of Stainless - Monel or Bronze

SNUBBER CAGES —
For Bottom Hole Pumps

CLEAN OUT TAP & DIES —
For Sucker Rods
Tubing (All sizes and threads)
Blowout Preventer Studs

SAFETY TOOLS —
Safety Wheel Wrench for Rods
Safety Step for Climbing Polish Rods

TAPERED FISHING TAP —
For Fishing Bottom Hole Pumps

STUFFING BOXES —
(4 Styles)
With Chevron (V-Pac) Rings

●

WRIST PINS
With Tapered Slips — Wrist Pin Puller — Crank Hole Reboring Machine for Field Use

POSITIVE LIFT VALVES —
For Breaking Gas Locks

ROD SOCKETS —
Bulldog Type 2" to 3" Inc.

"ON & OFF COUPLER"—
For Running Oversize Pumps

VALVE SEAT PULLER

POLISH ROD LUBRICATOR —
Using Shredded Graphite for Lubrication

TESTING MACHINES —
For Ball & Seat Assemblies — Air Bubble Principle

TUBING PARACHUTE —
To Prevent Tubing Stretch — Also in Case Tubing is Dropped

BAIRD MFG. CO.—TULSA

Brazoria County: Paul M. De Motte et al 1 W. B. Munson, in A. Darst Lge., south flank of Damon Mountd dome, dry, TD 382 ft.

Burleson County: Jordan Drlg. Co. 1 F. H. Hitchcock, in J. M. Sanchez 2½ Lge., Grant 1, 1 mi. E of Chriesman townsite, dry, TD 4,100 ft.

Chambers County: Sun Oil Co. 1 Cline, in Joseph Whitcomb Lge., in West Oyster Bayou area, dry, TD 8,842 ft.

Fort Bend County: S. Richardson 1 Harlem State Farm, "Tract 3," Harlem Prospect, in Jesse H. Cartwright Sur., in Tr. 3 of State Farm lease, 3 mi. NW of Sugarland townsite, dry, TD 8,478 ft.

Harris County: J. Leonard Davidson 1 Joseph F. Meyer et al, in John Ely Sur., 4 mi. W of Pierce Junction prodn., and 4 mi. SW of Bellaire townsite, dry, TD 4,923 ft. This is an old well drilled deeper.

Matagorda County: Hunt Oil Co. 1 C. C. Mehrens, in I&GN Sur., A-292, Sec. 3, 2 mi. S of Midfield townsite, dry, TD 10,500 ft.

Refugio County: Arnold O. Morgan 1 Mrs. Audrey Baumgartner, on 270 ac. lse., 1½ mi. S of Refugio townsite, and 1 mi. W-NW of Woodsboro field, dry, TD 7,017 ft.

Victoria County: Ginther-Warren & Ginther 2 Mrs. Mary A. Simmons, in Placedo Benavides Grant, A-124, 5 mi. E of Placedo, dry, TD 6,261 ft.

Wharton County: Federal Roy. Co. & Welch 1 Mrs. Myra S. Pryor, in Wm. Robinson Lge., 6 mi. SE of New Taiton, dry, TD 8,511 ft.

H. C. Cockburn-Sohio Pet. Co. 1 Ben Davis, in T. M. Flack Sur., 2 mi. N of Lane City townsite, dry, TD 6,250 ft.

APPALACHIAN FIELD

Seven New Locations in Southwest Pennsylvania

PITTSBURGH.—In southwest Pennsylvania no production or producing horizons were noted in the several wildcat wells now drilling. Peoples Natural Gas Co. 4-3814 Camilla F. Griffin in Derry Township, Westmoreland County, elevation 2,238 ft., is drilling at 6,516 ft. The Tully lime was reached at 6,437 ft. or the top at 4,199 ft. subsea. This well is 1,400 ft. of No. 1 on the same farm, drilled several years ago with shows of gas but commercially unproductive.

New locations were seven: one each in Mahoning and South Bend townships, Armstrong County; one in Monroe Township, Clarion County; one in Morris Township, Greene County; and three in Allen Township, Washington County.

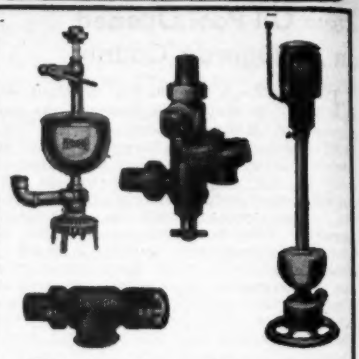
No wildcat completions or new locations were reported in West Virginia.

In Sheridan district, Calhoun County, Godfrey L. Cabot, Inc., 880 Mary V. Bunner, Corniferous lime 5,612 ft., Oriskany sand 5,798 ft., is drilling at 5,806 ft.

In Grant district, Jackson County, United Fuel Gas Co. 6337 Charley Boyce, elevation 782 ft., Corniferous lime 4,710 ft., Oriskany sand 4,852 ft., is drilling at 4,890 ft. In Tucker district, Wirt County, United Fuel Gas Co. 6335 I. T. Thompson, elevation 1,001 ft., Corniferous lime 5,173 ft., topped the Oriskany sand at 5,309 ft., with gas testing 112,000 cu. ft.

In Ravenswood district, Jackson County, Berea sand pool, four oil wells and one dry hole was reported: E. C. Hartman et al 1 D. E. Cole, 10 bbl. natural, total depth 2,348 ft.; Elsworth Jordan 2 W. H. Moore, 8 bbl. natural, total depth 2,140 ft.; Hope Natural Gas Co. 9247 R. D. Pickens, 30 bbl., total depth 2,171 ft.; Deems et al 1 U. B. Parsonage, 40 bbl., total depth 2,157 ft.; Fields & Crews 1 S. V. McMurray, dry after second shot, total depth 2,276 ft.

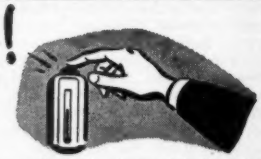
PENBERTHY QUALITY PRODUCTS



Penberthy injectors—ejectors—automatic electric and water (or steam) operated sump pumps are all widely used throughout the oil industry because they have always been dependable under the most severe service conditions.
All are of rugged construction and made by an organization with 59 years experience in the manufacture of highest quality products.

PENBERTHY INJECTOR CO.
DETROIT 2, MICH. Canadian Plant WINDSOR, ONTARIO

it's Cool!



Every room has adjustable air conditioning. Just turn controls in your room to the temperature you want.

it's Quiet!

Every room has noiseproofing. No outside noises to annoy you. Work, rest and sleep in comfort.

it's Homey!

Every room has a radio. No extra charge. Plus a good bed. And a private bath.

it's the Hotel Mayfair
8th & St. Charles
Rooms from $3.50
ST. LOUIS

ROCKY MOUNTAIN

Phillips Finds New Pool In Powder River Basin

DENVER.—Discovery of a new field on the southwest side of the Powder River Basin seems probable with the recovery of oil by Phillips Petroleum Co. at its 1 Unit, SE SW NW 17-34n-76w, in the South Cole Creek area of Natrona County. The well topped the Lakota sand at 8,289 ft. and on drill-stem test at 8,298-8,337 ft. the well made 2,400 ft. of 36°-gravity, light green oil in 30 minutes. Pressures and the fill-up are reported to indicate the well will make approximately 70 bbl. of oil per hour from the Lakota formation. The operator is now reaming hole to run casing for the well completion. This well is located on a seismic high between the Cole Creek and Big Muddy fields, and Phillips did considerable shooting in the area before making location for the test. A 5,280-acre block in the area has been unitized. General Petroleum Corp., operator of the Cole Creek field, abandoned a well in the NW SW SW of the same section in 1942 at 7,214 ft. Phillips found saturation in the Shannon and Dakota sands in their test, but the well will be completed in the Lakota.

Abandonment of General Petroleum Corp.'s Van Tassell wildcat, the 45-32-P, NE NE SW 32-30n-60w, Goshen County, Wyoming, has been announced with the well at 7,048 ft., total depth. This wildcat tested water in the Minnelusa and no commercial oil or gas production was established on tests. Granite was reported at 7,030 ft. with top of the Spearfish at 5,130 ft. This wildcat is located near the Nebraska state line, and General Petroleum did seismic work in the area prior to locating the well.

Oil production on the Pine Mountain dome, in Natrona County, Wyoming, is reported by U. S. Oil & Development Co. of Denver in its 2 Dame, NE NW NE 35-35n-84w. The well was drilled to 1,810 ft., total depth, 5 ft. in the Tensleep sand, and the hole filled with 1,400 ft. of oil. The operator estimated the well capable of producing at the rate of 150 bbl. of oil per day on the pump. There has been some oil produced from this structure several years ago, but the wells were abandoned. Recently the U. S. Oil & Development Co. found gas in that formation and is now on a drilling development program to establish a gas reserve.

Seaboard Oil Co.'s new pay well, the 37-28-G, NW SE SW 28-58n-100w, in the Silver Tip field, Park County, Wyoming, flowed 694 bbl. of 45°-gravity oil in 24 hours on test of the Tensleep formation this week. Top of the Tensleep sand was found at 8,664 ft. and the well is at 8,839 ft., total depth. Following production tests in the Tensleep, Seaboard will plug the well back and complete as a producer in the Phosphoria formation, where discovery was made early this year. The well extends the producing area of the field in the Phosphoria ½ mile northwest. Seaboard has now established production in the Peay (Frontier), Phosphoria and Tensleep formations in this field.

In the Bridge Creek area of Niobrara County, Pacific Western Oil Co. is now swabbing at the rate of 2½ bbl. of oil per hour from its Dakota formation discovery, the 1 Grimes-Government, NW NW SE 31-39n-61w. This well found the Dakota at 2,538 ft. and on drill-stem test at 2,567-85 ft. the well made 450 ft. of 35°-gravity green oil. The well was cored an additional 10 ft. and casing cemented. On swab test following this, the well made 120 bbl. of fluid with 99 per cent sulfur water in 8 hours. The well has been plugged back to 2,574 ft., where it is reported testing at the above rate. Location has been made for a third well on the block, which is held jointly with National Associated Petroleum Co. of Tulsa. Northwest of this test, British-American Oil Producing Co. has abandoned its 1 Manke, NW SW NW 35-40n-62w, in the Alkali Creek area, Niobrara County. The well was drilled to 5,058 ft. with Newcastle at 4,651 ft., Dakota 4,814 ft., and Lakota 5,024 ft. No shows were reported in the well, and the Newcastle section was extremely thin.

Frontier Refining Co. 1 Crittenden, C SE SE 12-17s-25e, Grand County, Utah, on the Bar-X structure, near the Colorado state line, discovered gas in the basal salt wash sand of the Morrison between 3,557-3,610 ft., and gas was also logged in the Chinle. The test was drilled to 4,493 ft., total depth, and failed to find the Weber section, going from Chinle into granite wash and then granite.

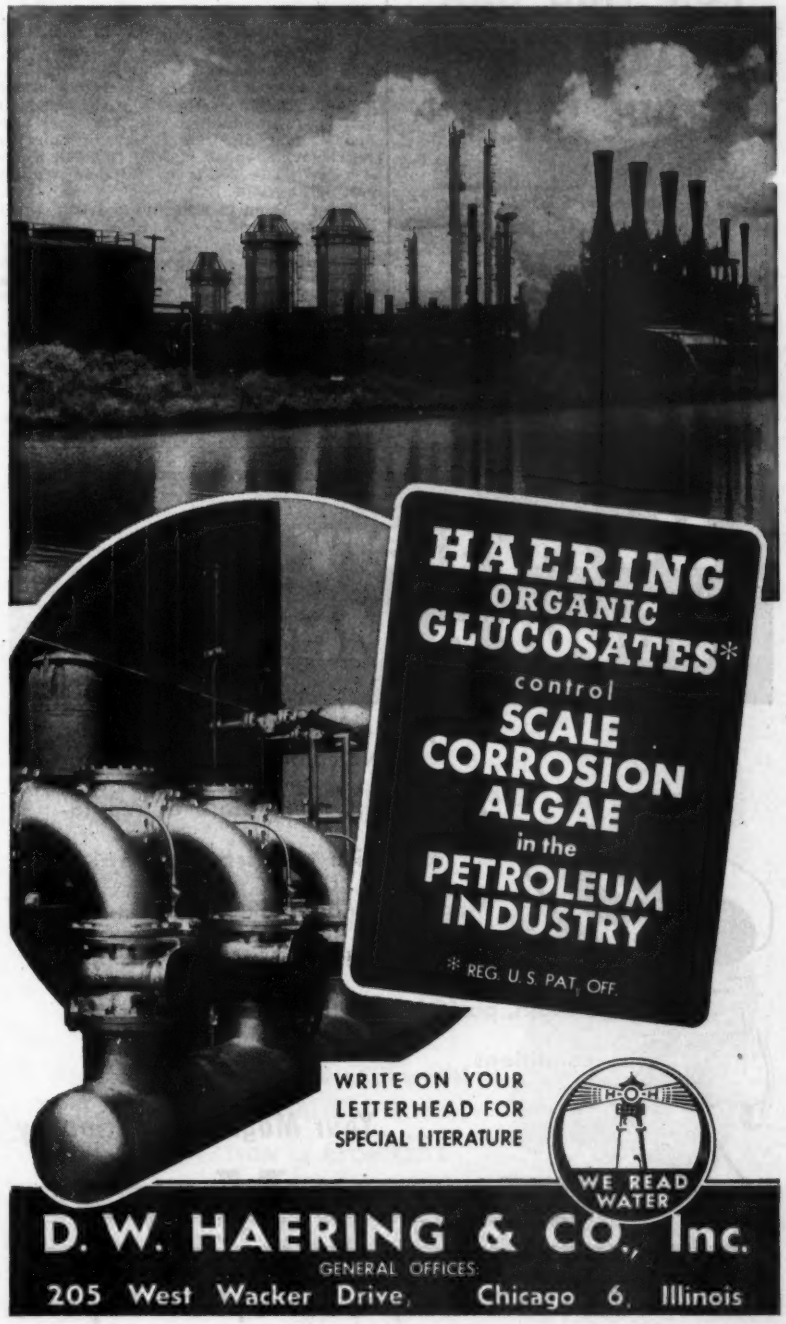
New locations.—A total of 28 new locations were made with 19 of the wells in Wyoming, 7 in Montana and 2 in Colorado. In Wyoming Stanolind made location for an interesting wildcat in the Chalk Mountain area of Carbon County at 1 Unit, NW SE NW 26-28n-81w. Location has been made for a 9,000-ft. Pennsylvanian test at Continental 1 Unit, SW SE NW 15-30n-119w, in the Afton area, Lincoln County, near the Idaho state line.

WYOMING WILDCAT FAILURE

Natrona County, Airport area: Commercial Oil & Gas 1 Rubish, NE NE SE 35-35n-80w, dry, TD 5,648 ft., first Wall Creek 3,746 ft., Muddy 4,874 ft., Dakota 4,997 ft., Lakota 5,065 ft., Morrison 5,109 ft., Sundance 5,230 ft., Nugget 5,562 ft., Jelm 5,605 ft.

MONTANA WILDCAT FAILURE

Teton County, Southwest Pondera: A. B. Cobb & Co. 37-25-Rice, NW SE SW 25-



FOR THIS CAN ON YOUR SUPPLY STORE SHELF

Use it on every threaded connection and you'll never be troubled with leaking connections. Over a million pounds used by the Industry in nine years.

Manufactured in Houston, Texas, by
RECTOR WELL EQUIPMENT CO., Inc.
Gen'l. Offices: Fort Worth, Texas

RECTORSEAL
THE POSITIVE LEAK PREVENTER

27n-5w, dry, TD 2,355 ft., Ellis-Madison 2,276 ft.

UTAH SUCCESSFUL WILDCAT

Grand County, Bar-X: Frontier Refining Co. 1 Crittenden, C SE SE 12-17s-25e, produced 3,750,000 cu. ft. of gas per day from 3,555-3,610 ft.; Dakota 2,830 ft., Morrison 2,996 ft., Entrada 3,608 ft., Navajo 3,839 ft., Chinle 4,340 ft., granite was 4,435 ft., granite 4,485 ft., TD 4,493 ft., PB 3,865 ft.

ILLINOIS

Wayne County Wildcat Has Good McClosky Show

MATTOON.—Collins Brothers Oil Co. 1 A. J. Messman, N½ NW NW 33-1s-9e, Wayne County, has a good oil show. Operator has set casing for a test of the McClosky following a drill-stem test at 3,290-3,306 ft. that recovered 140 ft. of clean oil and 30 ft. of mud-cut oil. The well also had a slight show of oil on a test of the St. Genevive, called at 3,254 ft. Total depth is 3,402 ft. The well is located about 7 miles east of Fairfield, Ill.

Wayne County also has another good prospective producer at Nash Redwine 1 L. R. Bobbett, SE NW SE 17-1s-8e, east of the Geff pool area. A 1-hour drill-stem test of the McClosky at 3,274-79 ft. had gas in 5 minutes and flowed clean oil in 1 hour. Bottom-hole pressure was 1,200 lb. Operator has set casing for further tests.

Johnston Drilling Co. has set casing to 3,045 ft. for a test of the McClosky at 1 G. E. Mathis, SE SE NW 17-9s-10e, northeast of Shawneetown in Gallatin County. Total depth is 3,092 ft. The McClosky show was at 3,047-53 ft. The well also had several other shows that may be tested if the McClosky does not prove to be commercially productive.

ILLINOIS SUCCESSFUL WILDCATS

Edwards County: Illinois Mid-Continent Co. 1 Johnson, NW SE NE 20-2s-14w, IP 75 bbl., Renault, 2,918-31 ft., TD 3,097 ft.

Jasper County: J. L. Black 1 Wattlesworth, SW NW NE 12-7n-10e, IP 15 bbl., McClosky, 2,399-2,414 ft., TD 2,414 ft.

Wabash County: Phillips Petroleum Co. 1 Keeps-Pfeister Comm., NE SW NE 24-1s-14w, IP 180 bbl., O'Hara, 2,835-42 ft., TD 2,842 ft. (New pay).

ILLINOIS WILDCAT FAILURES

Edwards County: Ashland Oil & Refining Co. and H. E. Ledbetter 1 A. Jack, NW NW SW 17-2s-14w, dry, TD 3,150 ft.

Effingham County: Paul Doran 1 N. Culley, SE SW NW 15-6n-5e, dry, TD 2,556 ft.

Gallatin County: B. M. Heath 1 Colnon, NW NE SW 30-7s-8e, dry, TD 3,077 ft.

Jasper County: Don Slape 1 Bixler, NW NW NE 5-6n-9e, dry, TD 3,079 ft.

Lawrence County: Toler Drilling Co. 1 S. Wright, NE NE SE 29-3n-13w, dry, TD 2,856 ft.

Richland County: J. E. Linzy 1 L. Delzell, NE SE NE 7-4n-9e, dry, TD 3,064 ft.

White County: Great Lakes Carbon Corp. 1 Bohleber, SE NW SW 15-4s-9e, dry, TD 3,367 ft.

LA.-ARK.

Claiborne Parish Test Threatens Blowout

SHREVEPORT.—Hunt Oil Co. et al 1 A. O. Goodwin, 11,000-ft. wildcat southeast of the East Haynesville field in Claiborne Parish, was reported trying to blow out at total depth of 9,103 ft. in the Cotton Valley. Operators ran electrical log and attempted to take sidewall cores at 8,956 ft., but had no recovery. The survey was said to have shown poor indications, but a drill-stem test was made from 8,806-8,956 ft., using 500 ft. of water cushion. It developed a slight pressure in 25 minutes and started flowing the water blanket in 40 minutes. When 12 stands of pipe were pulled it was said to have flowed 45°-gravity oil through open tubing. Bottom-hole pressure was 3,380 psi., and 4,840 psi. when shut in.

In De Soto Parish, E. C. Laster 1 Perkins-McLaurin, 25-15n-14w, was drilling ahead below 5,362 ft. in the lower Glen Rose after coring some shows of oil and gas. Cores from 5,070-90 ft. recovered oolitic lime with streaks of shale and good gas odor. From 5,090-5,108 ft. the recovery was shale and lime with no shows. At 5,108-18 ft. there was further lime with gas odor. A 25-minute drill-stem test between 5,075-5,189 ft. produced a good blow at the start but recovered only 20 ft. of mud with no shows.

Crescent Drilling Co.'s 1 C. M. Matthews "Unit," Ruston gas field deep test in 29-19n-2w, Lincoln Parish, was circulating at 9,333 ft. in the Cotton Valley. It cored tight, fine-grained sand with slight distillate odor and taste at 9,205-22 ft. Recovery at 9,232-45 ft. was 11 ft. 4 in., being 1 ft. of hard, fine sand the same as above, 2 ft. of lime with no shows, 5 ft. of shaly sand with distillate odor, 2 ft. of lime and 8 in. of shaly sand with distillate odor and taste.

The California Co. 2 Breece Lumber Co., 30-17n-5e, Ouachita Parish, was still testing and attempting to shut off the salt water. From perforations in the Cotton Valley at 9,188-9,202 ft., it flowed 8 bbl. of fluid, being 90 per cent salt water and 10 per cent oil or distillate of 49.2°-gravity. The flow was killed and the hole acidized with 1,000 gal., after which it flowed 100 bbl. of salt water. Operators squeezed perforations and were waiting on cement.

No Mystery about a Magneto!

No complicated wiring diagrams, generators or regulators with a Fairbanks-Morse Magneto! Magneto ignition is a simple self-contained unit, easy to maintain, positive in action under all operating conditions.

...Your Magneto Ignition by

FAIRBANKS-MORSE

Sold and Serviced by Over 2,000 Experts

California 2 Maxey, 5 miles southeast of the Tremont field in Ouachita Parish, was ready to continue testing after replacing 46 joints of leaky casing at 1,769 ft. and 1,894 ft. After drilling out, it attempted to acidize at 9,540-44 ft., but the formation would not break down under 6,500 psi. pressure.

Arkansas wildcat operations included the following: Clark County, H. T. Ross 2 Fee is a new shallow operation in 32-10s-20w, drilling below 1,140 ft. In Hemptstead County, 7 miles southwest of Hope, Lee & Burnett 1-A Ollar, a scheduled 5,000-ft. test in 27-13s-25w, is drilling below 2,500 ft. In Lafayette County, Stanolind 1 Bodcaw, 29-19s-23w, was in shale and sand at 8,814 ft. Stanolind's 1 Union Saw Mill, 18-19s-24w, was drilling sand at 6,826 ft. It had base of the massive anhydrite at 5,394 ft., Hill sand at 5,568-82 ft., James lime 5,925 ft., and the Sligo at 6,322 ft., by electrical survey.

Carter Oil Co. 1 Ethredge, 20-19s-16w, Union County, was drilling at 7,118 ft., and S. W. Richardson 1 Shell-Pratt, 36-19s-15w, was drilling below 6,585 ft. in shale.

CANADIAN FIELDS

Redwater Well Indicates New Field Possibilities

CHATHAM.—Possibilities of a new oil field in the Redwater district 27 miles north of Edmonton are indicated by Imperial-Redwater 1, LSD 1, 32-57-21w4. Early reports indicate a flow was obtained in a drill-stem test at 3,110-30 ft. An Imperial official states: "We obtained an encouraging showing of oil. Just how good it was we won't know until we drill deeper or run casing for a production test." The area is about 50 miles north and 30 miles east of the main Leduc field.

Pincher Creek. — In the Pincher Creek area, in the southern Alberta foothills, Gulf Canadian-Pincher Creek 1, LSD 15, 24-3-29w4, bottoming at 12,516 ft. is continuing production tests of the lower Madison limestone, with a large wet gasser indicated. A recent 24-hour test gave 63 bbl. of 53°-gravity distillate from a 136-ft. section to 12,194 ft. Gulf Canadian - Walter Marr 1, LSD 1, 29-4-29w4, drilling down the flank of the same structure, is below 6,693 ft. A third test will be located.

Leduc wild well.—After delivering over 1,100,000 bbl. of oil since May 12, a further effort is being made to control Atlantic 3 wild well, LSD 12, 23-40-26w4. One of the two "relief" holes, drilled directionally to hit the D-3 zone in the gusher, has been finished satisfactorily and pressure-driven water is being forced into this hole. It is hoped to develop a stand of water sufficient to cut off the flow in the original well long enough to bring it under permanent control. Of the production the major portion has been marketed, and most of the remainder returned to formation.

Leduc operations.—In the Woodbend extension of the Leduc field, Continental 3, LSD 12, 7-51-25w4, plugged back to 4,220 ft. to become the first commercial producer in the lower Cretaceous, made 163 bbl. on 12-hour run, and was then closed for bottom-hole test. No allowable has been set. Continental 8, LSD 11, 7-50-26w4, finished at 5,194 ft., is making 194 bbl. a day. Imperial 36, LSD 10, 21-50-26w4, at 5,346 ft. has potential of 2,496 bbl. Imperial 71, LSD 6, 26-50-26w4, at 5,325 ft. flowed 72 bbl. an hour on initial test. Imperial 88, LSD 4, 28-50-26w4, at 5,093 ft. showed 70 bbl. an hour from the D-2 zone.

Following completion of Continental 3 as a producer from the lower Cretaceous, other companies are likely to test the same horizon, either by perforating in existing Devonian producers or drilling new wells. A number of the Leduc wells showed commercial possibilities in the upper horizon, but bypassed the Cretaceous to test the Devonian. Central Leduc Prycz 2-C, LSD 13, 25-50-26w4, is being drilled for Cretaceous production on the same location as a D-2 producer.

British-American Oil Co. has entered the Woodbend extension, having located B-A Woodbend 1 in LSD 6, 7-51-26w4, about 2½ miles southwest of the Imperial producers.

Lloydminster.—In the Alberta section of the Lloydminster field, C. L. 8, LSD 14, 16-50-1w4, finished at 1,947 ft., has 35 bbl. initial production. C. L. 10, LSD 13, 16-50-1w4, at 1,948 ft. is pumping 40 bbl. initial. In the Blackfoot extension, Superior 15, LSD 16, 14-50-2w4, finished at 1,950 ft. with 85 bbl. initial. Superior 16, same LSD, at 1,951 ft. has 95 bbl.

On the Saskatchewan side, Van Lloyd Oils 4 in final flush test gave a strong flow of gas with 40 to 50 bbl. of oil per hour and no water.

Baxter Lake.—In the Baxter Lake area, north of Wainwright and 6 miles south of the Vermilion Consolidated 4 gasser, Pac Western - Consolidated Homestead 1 has brought in the first Colony sand oil producer in the Lloydminster area. Tests at 2,022-39 ft. indicated flush of 100 bbl. with no water. Colony sand is the original gas horizon in the Saskatchewan section of the field. On the pump, the well stepped up production to 135 bbl.

Morinville. — Following abandonment of Imperial-Volmer 1 after encountering a small oil production in the lower Cretaceous, Imperial Oil has acquired additional acreage in the immediate area, which is a part of the Morinville district. Two new tests are drilling, Imperial-Mearns 1, LSD 15, 6-56-26w4, 8 miles from the Volmer well, and Imperial-Morinville 2, LSD 8, 11-56-25w4.

Hanna.—In the Hanna district, south-central Alberta, Hanna Petroleums 1, LSD 8, 5-32-15w4, bottoming at 3,190 ft., has encountered a flow of gas, and is making drill-stem test.

Edgerton.—Edgerton Oils 5, LSD 5, 16-43-4w4, has been abandoned after coring to 2,409 ft.

THOMAS Flexible COUPLINGS
ALL METAL
SPECIFIED WHEREVER 100% DEPENDABILITY IS DEMANDED

Refiners specify Thomas "Flexible" Couplings for PUMPS, COMPRESSORS, COAL PULVERIZERS, COOLING TOWERS and GENERATOR SETS.

TYPE DBZ-C

Pipe Line Men know that Thomas "Flexible" Couplings on their Low or High Speed Pumps give 100% dependable service.

TYPE CM

Drilling Engineers get the most out of their equipment with Thomas "Flexible" Couplings on Engine, Gear and Mud Pump Drives.

TYPE DBZ-B

In the Laboratory Thomas "Flexible" Dynamometer Couplings assure the greatest accuracy.

TYPE DBZ

Thomas Flexible All-Metal Couplings Have No Wearing Parts.
BACKLASH, FRICTION and CROSS-PULL ARE ELIMINATED.

NO LUBRICATION IS REQUIRED!

Write for the new Engineering Catalog

THOMAS FLEXIBLE COUPLING CO.
WARREN, PENNSYLVANIA

Red Devil

DIA-HARD STEEL PISTON RODS

Universal Type

"F T" Type

A. P. I. Type

SPECIAL ALLOY STEEL plus a SPECIAL HARDENING PROCESS assures an EXTRA-HARD WEARING SURFACE which resists wear from stuffing box packing and abrasive fluids. It also provides a TOUGH, DUCTILE CORE which resists greatest tensile stresses. The smooth, highly-polished wearing surface reduces scoring and frictional wear, prolongs the life of stuffing box packing and prevents unnecessary "shut-downs" for repair and renewal.

WRITE FOR LITERATURE OR SEE COMPOSITE CATALOG

OIL WELL MANUFACTURING CORPORATION

6000 South Alameda Street
Los Angeles 1, California
Cable Address "OWMCO"

You'll find 'em where the GOING is TOUGH!

HOBBS POLE TRAILERS

Built in the center of the great Texas oil fields, HOBBS Pole Trailers are engineered to get the job done economically where the going is toughest. And HOBBS Pole Trailers can take punishment too. Ask anyone who uses Hobbs equipment.

Three Models to Get the Job Done!

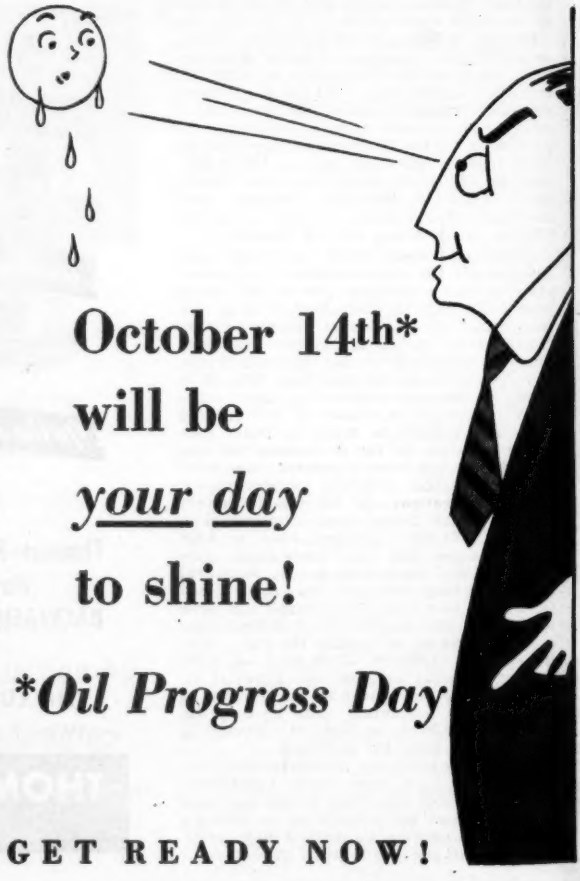
Engineered for use behind trucks with oil field bodies; with trucks not equipped with platform bodies; one model is 4-wheel wagon usable many ways.

ASK FOR SPECIFICATIONS

HOBBS MANUFACTURING COMPANY

HOUSTON, TEXAS FORT WORTH, TEXAS

Please Mention The Oil and Gas Journal



October 14th* will be *your day* to shine!

*Oil Progress Day

GET READY NOW!

PERMIAN BASIN

Deepest Drilling Well in West Texas at 13,941 Ft.

MIDLAND.—Currently the deepest drilling well in West Texas, Wilshire Oil Co., Inc., 1 McElroy Ranch, Upton County wildcat 4½ miles east of McElroy field, had total depth at 13,941 ft. On an elevation of 2,749 ft. top of the Ellenburger was placed at 13,860 ft., by samples. A drill-stem test, presumably to total depth, was under way on last report. The 1 McElroy has had three oil shows, from the Wolfcamp at 7,992-8,004 ft., and again at 9,424-82 ft., and 9,800-9,900 ft. The above top on the Ellenburger is approximately 1,400 ft. low to Gulf Oil Corp.'s 103 McElroy, 12,786-ft. failure 6 miles southwest.

Plymouth Oil Co. 1 J. B. Wallace, third well in Benedum field, flowed 25½ bbl. of oil the first hour of a 17-hour gage, through ⅜-in. tubing choke. It averaged 21½ bbl. of oil an hour the next 6 hours, and continued testing. Corrected total depth is 11,500 ft. Location is ¾ mile north and slightly east of the discovery well.

Gulf Oil Corp.'s 1-E C. W. Bryant, wildcat test 14 miles southeast of Midland, had good prospects for production when it recovered 540 ft. of gas-cut drilling mud, 2,250 ft. of clean oil and 210 ft. of salt water on a drill-stem test of the Silurian from 12,645-767 ft. Gas came to the surface in 10 minutes, rated at 78,000 cu. ft. daily. Drill pipe unloaded additional fluid when coming out. Oil tested 48° gravity. Contract is to the Ellenburger and operators were to drill ahead. The Texas Co. 1 Scharbauer, Midland County wildcat 1 mile south of Warfield, was drilling ahead after a 35-minute drill-stem test from 10,210-56 ft. recovered 5 ft. of drilling mud. The section was not identified.

A ¾-mile east extension to the Tunstill field of Reeves County was completed at J. S. Grisham and C. O. Davis 1 Grisham-Hunter Corp. It topped the Delaware at 3,256 ft., with pay from 3,292-3,300 ft., total depth. Twenty-four hour flowing potential was 105 bbl. of 42.7°-gravity oil.

WEST TEXAS (DISTRICTS 8 & 7-C) SUCCESSFUL WILDCATS

Ector County: Cities Service Oil Co. 1 Foster, Sec. 9, Blk. 43, T&P Sur., 2½ mi. SW S Cowden field, flowed 249 bbl. 35°-gravity oil a day, plus 25 bbl. water, ½-in. choke, Grayburk 4,149-4,215 ft., TD 4,410 ft., PB 4,215 ft., elevation 3,045 ft.

Humble Oil & Refining Co. 4 Yarbrough & Allen, Sec. 31, Blk. 14, PSL Sur., 3½ mi. S and slightly W Yarbrough & Allen field, pumped 94.7 bbl. oil a day, some water, Ellenburger 10,595 ft., TD 10,800 ft., PB 10,768 ft., elevation 2,803 ft.

Gaines County: The Texas Co. et al 1 Jenkins, Sec. 4, Blk. A-25, PSL Sur., 6 mi. N Union field, flowed 175 bbl. 27°-gravity oil plus 40 bbl. water, Devonian 9,100-80 ft., TD 11,705 ft., PB 9,180 ft., GOR 225 cu. ft., tubing pressure 130 psi., elevation 3,418 ft., discovery of Jenkins field.

Pecos County: Humble Oil & Refining Co. 1 Alma D. Unsicker, Sec. 15, Blk. 10, H&GN Sur., 2 mi. SW Pecos Valley field, pumped 67 bbl. 39°-gravity oil a day, some water, perforated 5,630-60 and 5,800-50 ft., TD 8,460 ft., PB 5,704 ft., elevation 2,513 ft.

WEST TEXAS (DISTRICTS 8 & 7-C) WILDCAT FAILURES

Gaines County: Amerada Petroleum Corp. 1 San Salvador Development Co., Sec. 4, Blk. G, G&MMB&A Sur., 17 mi. E Seagraves, dry, TD 4,885 ft., anhydrite 2,130 ft., Yates 2,930 ft., elevation 3,194 ft.

Howard County: Cascade Petroleum Co. 1 W. M. Spears, Sec. 36, Blk. 31, T&P Sur., 2 mi. W Coahoma, dry, TD 4,460 ft., no tops reported.

C. W. Guthrie 1 Mabel Quinn, Sec. 26, Blk. 34, T&P Sur., 8 mi. SW Big Spring, dry, TD 3,441 ft.

Hudspeth County: Seaboard & Shamrock 1-C University, Sec. 45, Blk. C, University Lands, 55 mi. E El Paso, dry, TD 3,117 ft.

Runnels County: LaGloria Corp. 1 W. M. Ashton, Sec. 150, ETRR Sur., 3 mi. NE Ballinger, dry, TD 2,640 ft., lime 2,640 ft.

Sutton County: Taylor Refining Co. et al 1 Meta Rieck, Sec. 8, Blk. A-4, TCRR Sur., 6 mi. from south line and 1½ mi. from east line of county, dry, TD 4,367 ft., Mississippi 4,022 ft., Ellenburger 4,156 ft., elevation 2,267 ft.

Upton County: Humble Oil & Refining Co. 1-B R. H. Barnett, Sec. 39, Blk. Y, TCRR Sur., 3 mi. NW Benedum field, dry, TD 9,545 ft., San Andres 3,770 ft., elevation 2,697 ft.

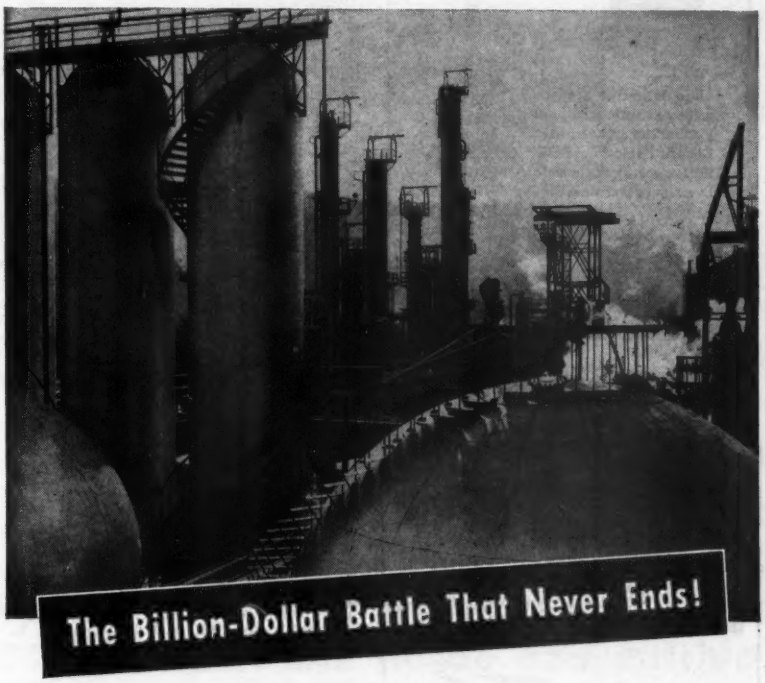
SOUTHEASTERN NEW MEXICO

HOBBS.—Richfield Oil Corp. 2 Comanche Unit, 24-11s-26e, Chaves County, continued testing on the pump. After treating with 2,000 gal. at 6,157-84 ft., it swabbed 30 bbl. of fluid a day, being 80 per cent salt water. In Eddy County, Magnolia Petroleum Co. 1 Foster Unit, 26-20s-23e, was drilling at 1,060 ft. in the Yeso lime section. Neil H. Wills 1 Wills, 8-21s-26e, was drilling limestone at 1,520 ft. No tops were available.

Texas Pacific Coal & Oil Co.'s 39-A State, 9-22s-36e, prospective Pennsylvanian discovery in the South Eunice field, drilled from 11,005 ft. to 11,045 ft. and prepared to run casing for completion attempts. Cores from 11,006-11,016 ft. recovered 6 ft. of black shale with innerbedded lime stringers. Production was shown on a drill-stem test at 10,995-10,944 ft.

SOUTHEASTERN NEW MEXICO WILDCAT FAILURES

Chaves County: Humble Oil & Refining Co. 1 State "U," SW SE 10-12s-27e, dry, TD 7,851 ft., Glorietta 2,560 ft., Yeso 2,690 ft., Pennsylvanian 5,725 ft., Silurian 7,200



THE battle between industry and corrosion goes on endlessly. A one-sided fight, too — with industry taking it on the chin to the tune of billions of dollars a year. But maintenance expenditures caused by corrosion can be greatly reduced by using Koppers Industrial Protective Coatings.

For example, take the problem of tank maintenance. Koppers Bituplastic* coats exposed tank parts with a tough, thick film that doesn't "alligator" or check . . . that is fire retardant and resists weather and corrosive industrial fumes. Heat-reflecting aluminum paint can be applied without bleeding.

Koppers Bituplastic has many other advantages. And it's only 1 of a family of Koppers Coatings — all specifically formulated to meet special conditions. Write us about your particular problems, and we'll tell you how Koppers Protective Coatings can help win *your* war against corrosion.

KOPPERS

*Trade-Mark Reg. U. S. Pat. Off.

KOPPERS COMPANY, INC., DEPT. 905T, PITTSBURGH 19, PA.

PENBERTHY
SUMP PUMPS

Used wherever seepage water accumulates, the Penberthy Automatic Electric Sump Pump and the Penberthy Automatic Drainer (water or steam operated) have demonstrated their superiority in this service. Simple and rugged design—copper and bronze construction throughout.

PENBERTHY INJECTOR CO.
DET... MICH. Canadian Plant WINDSOR, ONTARIO

ft., Montoya 7,245 ft., Ellenburger 7,415 ft., first quartz 7,575 ft., pre-Cambrian 7,835 ft., elevation 3,672 ft.

Lea County: Vickers Petroleum Co., Inc., 1 Continental-Barnes, NE NW 26-9s-35e, dry, TD 5,316 ft., anhydrite 2,177 ft., Yates 2,861 ft., San Andres 4,095 ft., tentative Glorietta 4,995 ft., elevation 4,117 ft.

MICHIGAN

St. Peter Test Planned For Reed City Field

SAGINAW.—Believing the St. Peter sand may be a potential oil or gas source, the Ohio Oil Co. is planning to deepen their 3 Stedman, originally abandoned at 5,030 ft. The well is located in 29-18n-10w, Osceola County, and will not only be the deepest test in the Reed City pool, but also the deepest well drilled on the west side of the basin area. It is scheduled to go to 9,000 ft. or more.

The 3 Stedman will be the second deep test drilled by Ohio Oil Co. this year. Last February, that company, in conjunction with Pure Oil Co., completed the deepest well ever drilled in the state, the 1 Reinhardt in the West Branch field, Ogemaw County.

The second followup test and first producer indicated in the new area opened recently by Gulf Refining Co. 1 State-Sylvan, 9-18n-7w, Osceola County, logged a Dundee show at 3,933 ft. The well is the Gulf 1 Doane, 16-18n-7w, which showed gas and approximately 35 ft. of oil-cut mud in 90 minutes on a drill-stem test of the brown porous dolomite. The hole was bottomed out at 3,940 ft. with 5-in. casing cemented at 3,933 ft. Operators are cleaning out for completion.

OHIO, KENTUCKY

John Morrow Et Al Finishes Fishing Job

COLUMBUS.—John Morrow et al succeeded in cleaning up a bad fishing job and drilling their wildcat 1 L. F. Murray, Section 12, Meigsville Township, Morgan County, through the Medina to total depth of 5,227 ft. No shows were found in either the Clinton, 5,036-50 ft. and 5,068-5,127 ft., or in the Medina at 5,206-24 ft., and the hole will be plugged back to the Oriskany at 3,710 ft. to test a showing of gas.

Two nice gas wells were completed in Perry County. The Four Way Oil & Gas Co. 4 John Scofield, Section 24, Hopewell Township, topped the Clinton at 3,027 ft. and finished at 3,042 ft. with a natural open flow of 1,714,000 cu. ft. In Madison Township, the Mid East Oil Co. 2 Charles Hammer, Section 28, reached the Clinton at 3,255 ft. and at the total depth of 3,273 ft. had 2,225,000 cu. ft. natural.

EASTERN KENTUCKY

ASHLAND. — Menifee County, 21-R-72, Willett Groover et al are drilling below 1,225 ft. on their 1 Motley, the only deep wildcat test drilling in the county. Corniferous lime, topped at 1,180 ft., has had no commercial shows to date.

EASTERN KENTUCKY WILDCAT FAILURE

Powell County: Roy Davis et al 1 George Reddix, 4-Q-68, dry, TD 2,710 ft., Corniferous 300 ft., Tyrone 1,275 ft., St. Peters 1,945 ft., Knox 2,000 ft., salt water.

SOUTH CENTRAL KENTUCKY WILDCAT FAILURE

Barren County: W. T. Rich 1 Bryant Houchens, 14-F-43, dry, TD 2,358 ft., Chattanooga shale 198 ft., Brassfield 440 ft., Tyrone 1,052 ft., Knox 1,756 ft.

WESTERN KENTUCKY

OWENSBORO.—In the Guffie pool, Miller & Shiarella and Ashland Oil & Refining Co. have completed 2 Wiggins-Iglehart, 19-N-27, with an initial production of 100 bbl. per day, pool allowable, from the Jackson sand at 1,879-86 ft. Total depth is 2,025 ft.

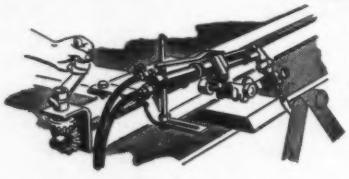
In Daviess County, John Tuttle has completed 1 Roach, 12-P-28, with an initial production of 50 bbl. per day on pump. Production is from the Palestine at 980-992 ft.

Sun Oil Co. has set casing at another South Morganfield well, 5 W. A. Anderson, 23-O-19, Union County. The well had the Waltersburg at 1,771-99 ft. and casing has been set to 1,764 ft. Sun also has staked an outpost for a test of the area southwest of the pool at 1 Collins-Walker, 4-N-19.

INDIANA

EVANSVILLE.—Sullivan County has a big Devonian oil well, probably the best Devonian well ever drilled in Indiana. Frederick B. Cline 1 Margaret Pittman, SW SW NE 30-9n-8w, about 2½ miles east of Shelburn and in the Shallow Wilfred pool, is on production test of saturated Devonian lime. Excellent saturation was reported at 2,020-30 and 2,040-48 ft. Crew perforated with 24 holes at 2,038-43 ft. and the well flowed 100 bbl. per hour for 2 hours before being choked down because of lack of tank space. On an early drill-stem test at 1,932-39 ft. in the Devonian, the well

NOW YOU CAN MACHINE-FEED YOUR WELDING TORCH
C&H STRAIGHT LINE CUTTER



A portable tool. Lies flat on work. Accurately machine-feeds by hand any size torch tip along straight line. Cuts like milling cutter. Can bevel or scarf; squarely cuts-off plates, rods and bars. Makes cleanest job. Pays for itself on one good sized job.

Write for descriptive bulletin.

Manufactured and distributed by

J. A. CAMPBELL COMPANY
645 E. Wardlow Rd., Long Beach 7, California

Are You WORRIED About Keeping Records

There is a KRAFTBILT business record form for every oil office and field need. In stock, ready for immediate shipment in any quantity, small or large. Save time and money by using KRAFTBILT Forms.

WRITE TODAY FOR CATALOG

Kraftbilt ROSS-MARTIN CO.
423 E. 4th St. TULSA, OKLA.

Write us for New descriptive Circular on Dragon Products

GET THEM AT YOUR SUPPLY STORE

DRAGON MFG. CO.
Marietta, Ohio

made 100,000 cu. ft. of gas and on another test at 2,006-22 ft., it made 1,000,000 cu. ft., indicating a strong gas cap. Total depth is 2,060 ft. and pay has not been acidized. Cline is running a drill-stem test of the Devonian at 1 Leon Wallace, a north offset to the Tillman well and has staked a south offset at 2 Harry Siepman.

INDIANA WILDCAT FAILURES

Gibson County: Joe Reznik 1 Sharp, NW NE SE 6-3s-12w, dry, TD 2,757 ft.
C. E. Skiles 1 Stermer-Jones, SW SE NW 21-1s-11w, dry, TD 2,264 ft.
T. B. Dirickson 1 D. S. Knowles et al, SW SW SE 2-3s-13w, dry, TD 2,757 ft.
Vanderburgh County: Ashland Oil & Refining Co. et al 1 C. J. Hahn, NW SW NW 28-7s-11w, dry, TD 2,583 ft.

CALIFORNIA

"Grass Roots" Pool Gets Even Shallower Pay

LOS ANGELES.—Tejon Hills field, unquie in that it produces from the astoundingly shallow depth of 500 ft., may really turn out to be a "poor man's" field if current reports that an even shallower productive sand has been found prove to be correct. Tejon Hills Oil Co., which discovered the field a few weeks ago, has completed four producing wells so far and all are capable of producing from 20 to 70 bbl. daily, each from depths between 400 and 550 ft. The company's seventh venture in the area, however, the 7 Tejon Hills, 10-11n-8w, is reported to have cored 25 ft. of excellent oil saturation at a depth of only 117-40 ft.

Testing is expected to get under way within a few days at Marine Exploration Co. 2 State, 11-5s-12w, a tidelands test being whipstocked out beneath the ocean at Seal Beach. The well is bottomed at 11,903 ft. and casing has been cemented on bottom. It is reported to have encountered some very good showings on the way down, indicating a new oil discovery may be in prospect. Besides being highly interesting from the discovery standpoint, the 2 State is one of the outstanding drilling jobs ever undertaken in the country. The well has been whipstocked several times and at present the hole has reached the highest angle from the vertical of any well ever drilled. Mechanical difficulties, such as stuck drill pipe, have been encountered rather frequently, but persistence on the part of the operators has succeeded in overcoming all the trouble so far without undue difficulty.

CALIFORNIA SUCCESSFUL WILDCATS

Kern County, Elk Hills area: Standard of California 311-24Z Uonpr., 24-30s-22e, flowed 71 bbl. of oil in 4 hr. through 15/64-in. choke, elev. 1,060 ft., TD 6,600 ft.
Los Angeles County, Placerita Canyon area: Parbe Oil Corp. 3-1 Philbert Comm., 31-4n-15w, pumped estimated 57 bbl. of oil per day, elev. 1,397 ft., TD 1,205 ft.

CALIFORNIA WILDCAT FAILURES

Kern County, Cuyama Valley area: Von Glahm & Leingang 1 Cole, 16-10n-27w, dry, elev. unknown, TD 3,797 ft.
Mount Poso area: Gene Reid Exploration Co. 1 Girard, 9-26s-28e, dry, elev. 925 ft., TD 1,468 ft.
Round Mountain area: Kern Oil Co., Ltd., 1 Oicese, 27-28s-29e, dry, elev. 1,300 ft., TD 2,885 ft.
Tejon Ranch area: Richfield Oil Corp. D-1-15 Tejon, 15-11n-18w, dry, elev. 1,051 ft., TD 1,398 ft.
Los Angeles County, Alondra Park area: British-American 5 Bodger, 22-3s-14w, dry, elev. 61 ft., TD 9,134 ft.
Monterey County, Salinas Valley area: The Texas Co. 3 Aurignac, 31-22s-10e, dry, elev. 1,320 ft., TD 4,765 ft.

OKLAHOMA

East Lindsay Pool Gets Another Big Well

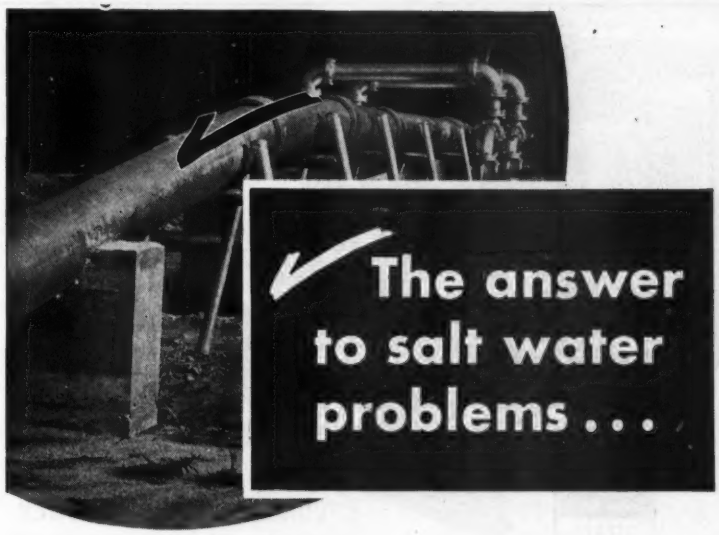
CARTER OIL CO. has another big Bromide producer in East Lindsay pool at 2 Edna Frankenberg, C NW SW 5-4n-3w, Garvin County. Operator perforated with 12 holes at 9,425-29 ft. and with packer set at 9,400 ft. the well flowed 300 bbl. of oil in 4 hours through ½-in. chokes at top and bottom. In the next 8 hours, the flow was 560 bbl. Additional perforations have been made at 9,470-73 ft. and testing will continue.

On the west edge of East Lindsay pool, Phillips Petroleum Co. has a gas-distillate well at 2 Martin Ranch, C NW NE 2-4n-4w, that is separated from Bromide production by a dry hole. Production is from the Oil Creek, a formation that has shown for gas and distillate production in wells within the pool proper. The formation was called at about 11,226 ft. and a drill-stem test at 11,226-59 ft. had gas in 19 minutes and recovered 250 ft. of distillate and 205 ft. of distillate-cut mud. Another test at 11,261-11,302 ft. had gas in 20 minutes, estimated at 30,000,000 cu. ft. and recovered 240 ft. of distillate. Operator is coring ahead.

Mohawk Drilling Co. has opened a new Skinner sand pool in eastern Logan County at 1 Amelia Marshall, SE SE SE 14-17n-1e. The Skinner sand was topped at 4,490 ft. The casing was perforated at 4,490-4,502 ft. for a 30-bbl. fillup. The well was started as a Wilcox test and was drilled to 5,160 ft. in that formation but was later plugged back to 4,560 ft. where casing was set.

OKLAHOMA SUCCESSFUL WILDCATS

Cleveland County: Continental 1 Maruska, SE SE SW 16-10n-4w, flowed 86 bbl. of 37.6°-gravity oil per day from Bois d'Arc



TRANSITE Asbestos-Cement PIPE curbs corrosion inside and outside

TRANSITE PIPE provides salt-water disposal lines that oil men know will give them years of dependable service. Made of asbestos and cement, it withstands the corrosive action of salt water on the inside, corrosive soil on the outside . . . holds costly replacement to a minimum.

Transite has other advantages, too. Its factory-made Simplex Couplings speed assembly . . . provide joints that *stay* tight in service. Flexible, they permit laying the pipe around curves without special fittings. Light in weight, Transite is easily handled . . . most sizes can be unloaded and lowered into the trench without mechanical handling equipment.

Use Transite Pipe to save on installation . . . to reduce maintenance . . . to eliminate frequent costly pipe replacements on your salt-water disposal lines. For all the facts, write Johns-Manville, Box 290, New York 16, New York.

JM

Johns-Manville TRANSITE PRESSURE PIPE

and Chimney Hill at 8,145-8,250 ft. and 8,492-8,532 ft., TD 9,098 ft.

Garvin County: Sinclair 1 Adair, C NW NE 10-4n-3w, flowed 533 bbl. of 42°-gravity oil per day from Deese at 6,903-7,040 ft. through 20/64-in. tubing choke, TD 7,067 ft.

OKLAHOMA WILDCAT FAILURES

Garfield County: Geological wildcat in Garber area—Kirkpatrick 1 Starr, SE NE SE 14-22n-4w, dry, TD 4,638 ft., Layton 3,855 ft., Hogshooter 4,060 ft., Checkerboard 4,218 ft., Big lime 4,300 ft., Oswego 4,380 ft., second Wilcox 4,578 ft.

Jackson County: Harvey 1 Burch, NW NW SE 18-1n-20w, dry, TD 4,351 ft., Arbuckle 4,241 ft.

Noble County: Stanolind 1 Headman, SE SW NE 8-24n-1e, dry, TD 4,996 ft., Mississippi chat 4,509 ft., Mississippi lime 4,520 ft., Woodford 4,860 ft., Viola 4,890 ft., Wilcox 4,938 ft., second Wilcox 4,952 ft.

Okfuskee County: Mohawk 1 Curry, SW NW NW 14-10n-9e, dry, TD 3,311 ft.

Oklahoma County: Leeper 1 Wiley, NE NE NE 9-12n-1e, dry, TD 5,032 ft., Checkerboard 4,661 ft., conglomerate 4,881-89 ft.

Jordan 1 Kennard, NW NW SE 25-14n-2w, dry, TD 6,222 ft., Pawhuska 2,642 ft., Belle City 4,075 ft., Hogshooter 4,610 ft., Checkerboard 4,900 ft., conglomerate 4,945 ft., Oswego 5,370 ft., Prue 5,555 ft., Verdigris 5,600 ft., Woodford 5,740 ft., Hunton 5,764 ft., Sylvan 5,856 ft., Viola 5,958 ft., dense 6,004 ft., Wilcox 6,107 ft., second Wilcox 6,186 ft.

Osage County: Hilt 1 Osage, C N/2 NW SW 12-20n-11e, dry, TD 1,730 ft., Bartlesville 1,487 ft., Burgess 1,720 ft., Mississippi lime 1,726 ft.

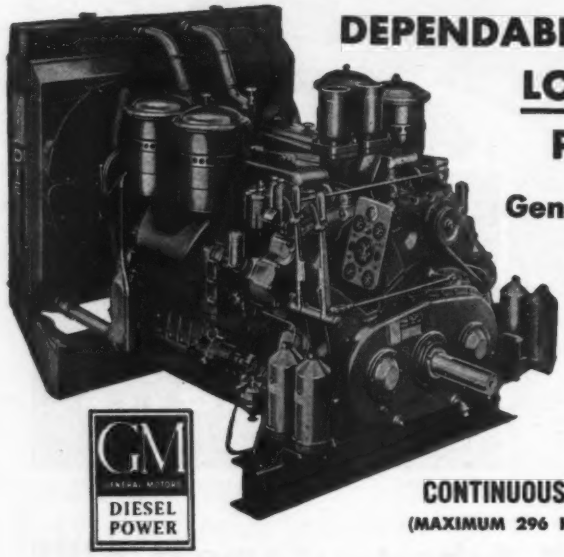
Millard 1 Osage, SE SE NW 8-25n-8e, dry, TD 2,765 ft., Hominy 2,678 ft., Arbuckle 2,695 ft.

Mid-Continent 1 Osage, NE NE SW 8-26n-9e, dry, TD 2,690 ft., Oswego 1,953 ft., Burgess 2,286 ft., Mississippi lime 2,313 ft., Arbuckle 2,612 ft.

Payne County: Berry 1 Berry, SW NE NW 14-17n-3e, dry, TD 4,004 ft., Red Fork 3,937 ft.

Barry 1 Jacobs, SE SE NW 25-18n-1e, dry, TD 5,056 ft., upper Skinner 4,268 ft., lower Skinner 4,360 ft., Bartlesville 4,466 ft., Mississippi lime 4,536 ft., Viola 4,833 ft., Wilcox 4,900 ft., second Wilcox 5,016 ft.

Mid-Continent 1 Nehr, C NW NE 23-18n-1w, dry, TD 5,590 ft., Checkerboard 4,322 ft., conglomerate 4,360 ft., Oswego 4,534 ft., Prue 4,736 ft., Verdigris 4,781 ft., Skinner 4,792 ft., Red Fork 4,872 ft., Bartlesville 4,696 ft., Mississippi lime 5,026 ft., Woodford 5,176 ft., Misener 5,217 ft., Hunton 5,226 ft., Sylvan 5,256 ft., Viola 5,338 ft., Wilcox 5,434 ft., second Wilcox 5,533 ft.



DEPENDABLE, LOW-COST POWER!

General Motors Twin 6-71 DIESEL 260

CONTINUOUS HORSEPOWER
(MAXIMUM 296 HP RESERVE POWER)

GM DIESEL POWER

Drilling in the oil fields is a 24-hour-a-day operation; and, an oil man's power must be dependable . . . It has to be compact and portable and require a minimum of maintenance. GM Diesels meet these requirements and more . . . They provide plenty of rugged power in a relatively small space and with low weight (only 21 pounds per horsepower). They're quick to start, they give smooth operation, and they're economical. Small wonder that more and more drillers are turning to General Motors Diesels!

There is a GM Diesel for your every need . . . ranging in size from 30 to 700 horsepower. Most models in stock in our New Orleans plant. Write for brochure.

'Round the Clock Parts and Service

George ENGINE CO., Inc.

1111 Jefferson Highway — New Orleans, La.
Lake Charles Branch — 512 Railroad Ave.

EASTERN TEXAS

Smith County May Have New Discovery Well

DALLAS.—Smith County had prospects of a new Paluxy sand discovery at Delta Drilling Co. 1 Rice, 3½ miles southwest of Tyler in the Oliver Anderson Survey. While the reports said the section drilled so far has been heavily shaled, a 30-minute drill-stem test recovered 90 ft. of clean oil, plus 600 ft. of water cushion. The test was run to total depth of 7,685 ft., with the upper limit unreported. Gravity of the oil was estimated to be 28°. Operators said there is a possibility of finding better pay in a lower section and were to drill ahead to the base of the Paluxy, or to 8,000 ft., contract depth.

Humble Oil & Refining Co. 1 Sackett, Smith County deep test, had total depth at 10,600 ft. in hard sand with streaks of shale. Operators washed the well and tested the 5½-in. casing with 1,500 psi. On last report it was circulating at 7,400 ft.

In Cherokee County, 10 miles east of Rusk, R. J. Caraway's 2 Aaron Sessions was dry at 4,684 ft., with no shows reported. Tops, by samples, were: Woodbine 4,402-4,535 ft., Georgetown 4,657 ft. Location is 930 ft. east and 137 ft. south of the 1 Sessions, in the J. M. Musquez Grant. Two miles northwest of Maydelle, Standard Oil Co. of Texas 1 T. E. Acker was drilling below 4,490 ft. Union Producing Co. 1 Travis, 3 miles southeast of Mount Selman, was drilling below 7,204 ft. in shale and lime.

Arrow Drilling Co. 2 Susie Chatton, de los Santos Coy Survey, south of the Lodi section of the Rodessa field of Marion County, had oil stains and odor in cores from 6,151-62 ft., and was coring ahead.

EAST TEXAS (DISTRICTS 5 & 6)
WILDCAT FAILURES

Henderson County: Star Oil Co. 1 Gamble & Lancaster, Wm. Keese Sur., 7 mi. S Malakoff, dry, TD 4,084 ft., Austin 3,216-3,640 ft., Woodbine 3,953 ft., by samples, elevation 279 ft.

Hill County: Hunt Oil Co. 1 E. W. Wright, John Hays Sur., 3 mi. SE Grandview, dry, TD 6,700 ft.

Wood County: Benco Oil & Gas Co. 1 J. D. Adrian, Geo. Hallmark Sur., 2 mi. W Golden, dry, TD 1,302 ft.

KANSAS

Sedgwick County Pool Opener Hits Maximum

SEDGWICK COUNTY'S pool opener, J. P. Gaty 1 Brown, NE NW NE 30-16s-2e, has been completed as a maximum 3,000-bbl. well. Production is from the Burgess sand, topped at 2,957 ft. and hole was drilled to 2,961 ft. The well is located between Wichita and Greenwich pool.

Nadel & Gussman have a prospective pool

opener at 1 Fischer, NE NE NW 36-21s-13w, Stafford County. Casing has been run to 3,735 ft. for a test of a saturated and porous section of Arbuckle. The formation top was called at 3,733 ft. and well drilled to 3,737 ft.

Bennett & Roberts Drilling Co. and Delta Production Co. have a producer at 1 Kelly, NW NW SE 35-23s-12w, Stafford County, about 3 miles north of Stafford pool. Well swabbed 11 bbl. per hour from the Arbuckle. Casing was set to 3,870 ft. and well was plugged back to 3,874 ft. and treated with acid.

Nemaha County wildcat, Carter Oil Co. 1 Strahm, SW SW NW 27-2s-14e, is reported to have had a show of oil in the top 3 ft. of the Hunton, marked at 2,847 ft. Casing has been run to 2,848 ft. The well is about 15 miles southwest of Livengood pool in Brown County.

Out of 53 new locations for the week, Butler and Russell counties reported six each and Rice County accounted for five.

KANSAS SUCCESSFUL WILDCAT

Rooks County: N. C. R. A. 1 Smith, SE SE SW 8-9s-18w, produced 1,480 bbl. of oil per day from Arbuckle 3,494-99 ft., TD.

KANSAS WILDCAT FAILURES

Barton County: Aledo Oil Co. & Lindas, SE SE SE 24-20s-14w, dry, TD 3,572 ft., anhydrite 820 ft., Lansing 3,254 ft., conglomerate 3,508 ft., Arbuckle 3,540 ft.

Ford County: Texas Co. 1 Davis, SW SW SE 19-27s-23w, dry, TD 6,058 ft., anhydrite 1,434 ft., Herrington 2,590 ft., Krider 2,620 ft., Winfield 2,688 ft., Ft. Riley 2,798 ft., basal Florence 2,900 ft., basal Americus 3,360 ft., Heebner 4,184 ft., Lansing 4,304 ft., Mississippi 4,994 ft., Warsaw 5,280 ft., basal Kinderhook 5,410 ft., Viola 5,682 ft., Simpson 5,808 ft., Arbuckle 5,894 ft.

Marion County: E. H. Adair 1 Buckley Estate, SW SW NE 24-19s-2e, dry, TD 2,708 ft., Kansas City 1,805 ft., Mississippian 2,413 ft., Viola 3,678 ft.

N. CENTRAL TEXAS

T. P. C. & O. Seeks Authority To Make Dual Completion

WICHITA FALLS.—Texas Pacific Coal & Oil Co. has filed application with the Texas Railroad Commission to make a dual completion at its 1-B TXL, discovery well 5 miles southeast of Eliasville, Stephens County, in Section 1, Block 5, SP Survey. Present completion is being made in the Caddo through perforations from 3,416-50 ft. The second producing zone is the Mississippi, from 4,499-4,535 ft., total depth.

Continental Oil Co. 1 Tyson, southwest offset to the Simpson discovery of the Hausler field of southern Wichita County, was cleaning out at 4,525 ft. and showing some oil after swabbing. This well was dry in the Simpson and the oil is believed coming from the Strawn section. Operators were to perforate at 4,498-4,520 ft. for completion tests. Location is 1½ miles northeast of Wichita Falls. A new 1,600-ft. Strawn test has been scheduled by Fortex Oil Corp. as the 1 A. Ramming, 900 ft. from north and 165 ft. from east lines of H. Hastie Survey, Section 2, 10 miles northeast of Wichita Falls.

Big Bear Oil Co. 1 J. T. Hunt, N. Mackey Survey, is a new location for a 6,000-ft. test 2 miles north and west of the Chico field. In the Chico field, Cities Service Oil Co. 2 Terrell, southeast offset to Kingwood Oil Co. 2 Garrett, was drilling below 5,450 ft. It recovered 630 ft. of oil on a test from 5,337-70 ft. Cities Service 1-B Berry, Thompson Survey, was drilling below 4,951 ft.

NORTH CENTRAL TEXAS (DISTRICTS 9 & 7-B) SUCCESSFUL WILDCATS

Callahan County: Anzac Oil Co. 2 Fred Heyser, Wm. A. Smith Sur., 10 mi. N Cross Plains, flowed 98 bbl. 41.8°-gravity oil a day, ¾-in. choke, GOR 685 cu. ft., TP 20 psi., Ellenburger 3,939-73 ft., TD, elevation 1,741 ft.

Clay County: Grace & Grace 1 Otis Smith, H. Tucker Sur., 1 mi. NW Shannon, flowed 139 bbl. 42.6°-gravity oil in 3 hours, ½-in. choke, Caddo 5,420-70 ft., CP 550 psi., TP 175 psi., GOR 1,110 cu. ft., TD 5,515 ft., elevation 1,058 ft.

Erath County: Haynes B. Ownby 1 W. C. Clayton, D. J. O. Millard Sur., 2½ mi. S Desdemona, flowed 57 bbl. 42°-gravity oil a day, ⅜-in. choke, CP 100 psi., TP 25 psi., GOR 1,965 cu. ft., limestone pay 3,004-06 ft., TD 3,021 ft.

Haskell County: Thomas D. Humphrey 1 J. M. Collins, Sec. 157, A-16, R. Brown Sur., 10 mi. E Haskell, pumped 44 bbl. 39.7°-gravity oil a day, Caddo 4,923-41 ft., TD 5,541 ft., PB 5,220 ft., elevation 1,470 ft.

Jones County: Danciger Oil & Refining Co. 2 Stephenson, M. Faragosa Sur., 3¼ mi. NE Noodle, pumped 64 bbl. oil plus some water, Reef limestone 2,925-28 ft., TD 5,445 ft., PB 2,945 ft., elevation 1,772 ft.

NORTH CENTRAL TEXAS (DISTRICTS 9 & 7-B) WILDCAT FAILURES

Brown County: Dobbs & Denhart 1 B. O. Boler, Sec. 2, HT&B Sur., 4 mi. NE Bangs, dry, TD 125 ft.

United North & South Development 2 J. W. Boatwright, S. T. Allen Sur., 4 mi. SW Rising Star, dry, TD 1,356 ft.

Callahan County: Tex Harvey Oil Co. 1 George Anthony, Sec. 2, D&DA Sur., 8 mi. N Putnam, dry, TD 4,176 ft., Caddo 3,293 ft., Mississippi 3,935 ft., Ellenburger 4,106 ft., elevation 1,390 ft.

Southern Minerals Corp. 1 Sammons, G. D. Spattswood Sur., 3½ mi. SW Cottonwood, dry, TD 4,271 ft., Caddo 3,155 ft., Mississippi 4,080 ft., Ellenburger 4,155 ft.

Star Oil Co. 1 Josie Brown, Sec. 2, BBB&CRR Sur., 6 mi. S Clyde, dry, TD 2,013 ft., King sand 1,591 ft., Swastika 1,752 ft.

Clay County: Noranda Oil Co. et al R. D.

(Continued on page 153)

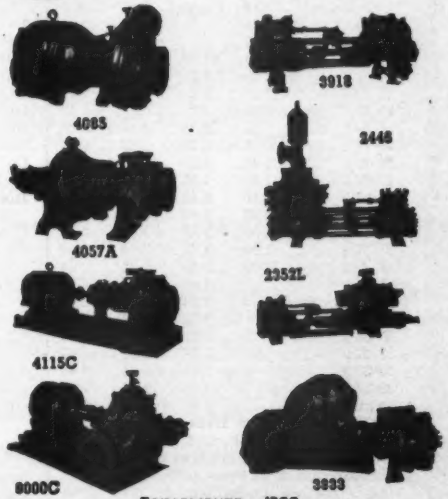
UNEXCELLED . . . . .

for keeping diesel fuel nozzles free of gum and carbon—

add regularly to fuel and lube oil—
Reduces friction and fast wear.

HOBB SWETNAM CO., INC.
WICHITA FALLS, TEXAS

PUMPS
CENTRIFUGAL
RECIPROCATING
BUILDERS OF OUTSTANDING PUMPS
Since 1869



ESTABLISHED 1869
DEAN BROTHERS PUMPS INC.
INDIANAPOLIS IND.
323 W TENTH ST.

STATISTICS and T

WEEKLY WELL COMPLETIONS . . . WEEK ENDED SEPTEMBER 4, 1948

	Total of all wells							Wildcat completions and discoveries									
						Cum.							Cumulative total, 1948				
	Comp.	Oil	Gas	Dry	Footage	1948	1947	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	28	14	0	*14	32,804	1,045	1,088	0	0	0	0	0	0	0	0	0	0
Pennsylvania	45	20	5	†20	70,696	1,783	1,984	0	0	0	0	0	0	0	9	13	22
West Virginia	21	8	10	3	53,553	541	571	0	0	0	0	0	3	0	33	36	72
Ohio	20	5	4	‡11	48,386	923	888	0	0	0	0	0	2	0	9	23	34
Indiana	23	11	0	12	38,131	701	433	0	0	0	4	4	19	0	1	35	55
Kentucky	13	6	0	7	19,771	470	459	0	0	0	2	2	7	0	0	19	26
Illinois	63	26	0	37	171,723	1,598	1,363	3	0	0	7	10	34	0	1	246	281
Michigan	16	10	0	§6	31,899	552	585	0	0	0	0	0	13	0	8	171	192
Kansas	68	34	13	‡21	217,735	2,063	1,750	1	0	0	3	4	39	0	5	286	330
Neb., Mo., Iowa	0	0	0	0	0	5	4	0	0	0	0	0	0	0	0	4	4
Oklahoma	82	45	7	‡30	321,225	2,760	2,819	2	0	0	12	14	90	7	22	429	548
Texas	251	143	8	100	1,121,797	7,911	6,148	12	0	0	52	64	233	23	72	1,387	1,715
North Central (Dist. 7-B & 9)	86	39	0	47	288,019	2,482	1,997	4	0	0	22	26	84	0	10	497	591
West (Dist. 7-C & 8)	72	63	0	9	347,591	2,146	1,480	3	0	0	7	10	52	0	3	156	211
Panhandle (Dist. 10)	13	7	5	1	40,111	424	295	0	0	0	0	0	0	0	3	7	10
Eastern (Dist. 5 & 6)	11	4	1	6	45,378	370	348	0	0	0	4	4	9	2	0	79	90
Gulf Coast (Dist. 2 & 3)	43	17	2	24	269,155	1,255	1,069	2	0	0	10	12	54	18	21	300	393
Southwest (Dist. 1 & 4)	26	13	0	13	131,543	1,234	959	3	0	0	9	12	34	3	35	348	420
Louisiana	69	52	7	10	261,669	1,547	988	2	0	0	2	4	34	20	3	143	200
Northern	52	39	7	6	102,280	1,031	556	0	0	0	0	0	3	2	0	71	76
Southern	17	13	0	4	159,389	516	432	2	0	0	2	4	31	18	3	72	124
Arkansas	4	3	0	1	12,540	196	193	0	0	0	0	0	5	0	0	62	67
Mississippi	11	2	1	8	75,551	278	332	0	0	0	6	6	3	1	3	65	72
Southeastern States	¶3	0	0	3	14,768	38	40	0	0	0	2	¶2	0	0	0	35	35
Montana	8	4	0	4	16,476	191	183	0	0	0	1	1	3	0	0	15	18
Wyoming	12	6	1	5	63,928	356	153	0	0	0	1	1	19	0	1	40	60
Colorado-Utah	4	3	1	0	23,631	163	135	0	0	1	0	1	0	0	5	31	36
New Mexico	17	12	1	4	84,450	416	356	0	0	0	2	2	4	1	1	36	42
California	57	50	0	7	235,052	1,962	1,316	2	0	0	6	8	87	1	4	204	296
Total United States	815	454	58	303	2,915,785	25,499	21,788	22	0	1	100	123	595	53	177	3,280	4,105
Total previous week	815	442	73	300	2,964,683	24,684	21,075	25	3	9	119	156	573	53	176	3,180	3,982
Total September 6, 1947	713	366	67	280	2,346,886			21	3	2	100	126	466	66	140	2,697	3,369

Service wells included: *14, †20, ‡1, §4. ¶Incl. 1 Tenn.

CRUDE PRICES AND REFINERY ACTIVITY

GRAVITY SCHEDULES

Top prices include all gravities above grades designated, and low prices include all gravities below grades designated:

Gravity—	Signal Hill, Calif.	Oklahoma, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$2.17	....	....	....
19-19.9	2.19	....	....	....
20-20.9	2.21	$2.25	....	$2.12
21-21.9	2.23	2.27	....	2.14
22-22.9	2.27	2.29	....	2.16
23-23.9	2.30	2.31	....	2.18
24-24.9	2.34	2.33	$2.56	2.20
25-25.9	2.38	2.35	2.58	2.22
26-26.9	2.41	2.37	2.60	2.24
27-27.9	2.45	2.39	2.62	2.26
28-28.9	2.49	2.41	2.64	2.28
29-29.9	2.52	2.43	2.66	2.30
30-30.9	2.56	2.45	2.68	2.32
31-31.9	2.59	2.47	2.70	2.34
32-32.9	2.62	2.49	2.72	2.36
33-33.9	....	2.51	2.74	2.38
34-34.9	....	2.53	2.76	2.40
35-35.9	....	2.55	2.78	2.42
36-36.9	....	2.57	2.80	2.44
37-37.9	....	2.59	2.82	2.46
38-38.9	....	2.61	2.84	2.48
39-39.9	....	2.63	2.86	2.50
40 and above	....	2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point. †Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947. (For detailed price changes in all fields see The Oil and Gas Journal, January 1, 1948, page 107.)

A.P.I. REFINERY REPORT, WEEK ENDED AUGUST 28

(Thousands of barrels)

District—	Crude runs, daily avg.	Production: Gasoline†	Kerosine	Gas & dist. oil	Residual	Stocks at refineries, bulk terminals, in transit and in pipe lines: Gasoline*	Kerosine	Gas & dist. oil	Residual
East Coast	855	2,195	313	1,208	1,613	23,090	10,591	20,408	11,731
Appalachian:									
District 1	104	323	30	97	76	2,014	440	712	390
District 2	28	96	6	34	68	894	91	261	161
Ind., Ill., Ky.	908	3,331	344	947	1,059	19,709	4,190	10,530	5,905
Okla., Kans., Mo.	473	1,685	120	728	570	8,112	1,363	5,480	2,184
Inland Texas	256	1,057	77	189	419	3,378	760	1,124	1,002
Texas Gulf Coast	1,466	4,462	670	2,257	1,883	14,212	2,520	8,386	8,319
La. Gulf Coast	452	1,307	363	706	605	5,165	1,697	3,727	2,349
N. La. and Ark.	90	230	54	93	146	2,253	443	518	255
Rocky Mountain:									
New Mexico	13	44	7	12	28	74	25	44	31
Other Rocky Mtn.	157	477	30	194	222	1,900	284	1,296	978
California	880	2,515	151	1,026	2,129	14,703	877	13,835	37,548
August 28, 1948	5,682	17,722	2,165	7,491	8,818	95,504	23,281	66,321	70,853
August 21, 1948	5,591	17,742	1,988	7,338	8,642	95,132	22,497	63,524	69,379
August 30, 1947	5,255	17,043	1,920	6,019	8,879	86,300	20,736	54,075	56,283

*Finished and unfinished. †At refineries including natural blended.

Bureau of Mines crude-oil stocks 222,170,000 bbl. as of August 28—up 434,000 bbl. One year ago 228,281,000 bbl.

FLAT CRUDE PRICES

Representative posted schedules per bbl.

East Texas	$2.65	Pecos County, Texas (Yates)	2.35
Kettleman Hills, California*	2.14	Bradford, Pennsylvania	5.00
Beauregard Parish	2.60	Eastern Ill. and Western Ind.†	2.77
Illinois Basin	2.77	Tomball, Texas Gulf Coast	2.83

*37°-37.9°. †35° and above.

TRENDS

DAILY AVERAGE PRODUCTION FOR WEEK

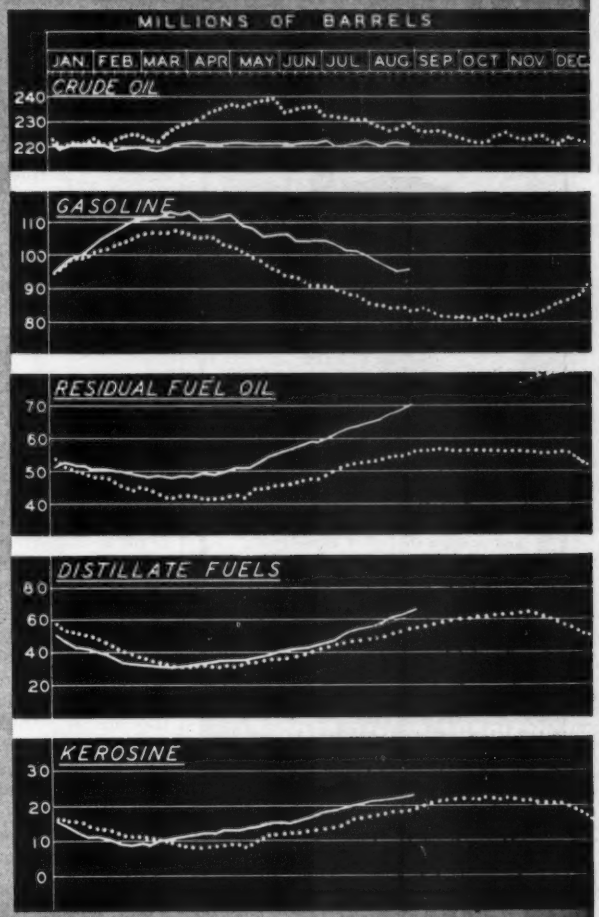
	Sept. 4 crude oil	B. of M. Sept. demand	Aug. 28 crude oil
Alabama	1,350	1,200	1,350
Arkansas	82,450	90,000	82,925
California	952,000	955,000	950,200
Colorado	47,540	50,000	47,790
Eastern	64,200	66,300	64,600
Florida	800	800	810
Illinois	183,400	170,000	177,500
Indiana	21,500	17,000	21,200
Kansas	290,500	307,000	306,200
Kentucky	25,400	24,000	25,700
Louisiana	483,950	500,000	483,050
North Louisiana	113,675	.....	113,850
South Louisiana	370,275	.....	369,200
Michigan	42,800	46,000	45,900
Mississippi	129,500	131,000	129,685
Montana	26,140	27,000	26,200
Nebraska	400	700	400
New Mexico	132,135	138,000	132,970
Oklahoma	429,250	438,000	427,450
Texas	2,460,475	2,520,000	2,446,600
Dist. 1 (Southwest)	28,800	.....	29,005
Dist. 2 (Southwest)	179,500	.....	178,900
Dist. 4 (Southwest)	250,400	.....	250,375
Dist. 3 (Gulf Coast)	494,050	.....	493,420
Dist. 5 (Eastern)	49,150	.....	49,575
Dist. 6 (Eastern)	120,025	.....	120,000
East Texas field	309,025	.....	304,000
Dist. 7-C (West)	44,575	.....	43,600
Dist. 8 (West)	706,425	.....	703,050
Dist. 7-B (W. Central)	52,175	.....	50,725
Dist. 9 (N. Central)	139,725	.....	137,850
Dist. 10 (Panhandle)	86,625	.....	86,100
Wyoming	151,210	158,000	150,850
Total United States	*5,525,000	5,640,000	5,521,380
Change from prev. wk.,	up 3,620		

Total production January 1-September 4 †1,359,880,805 bbl.
Same period last year (crude plus cond.) 1,230,177,565 bbl.

*Not incl. 75,815 bbl. condensate. †Incl. 18,393,285 bbl. condensate.

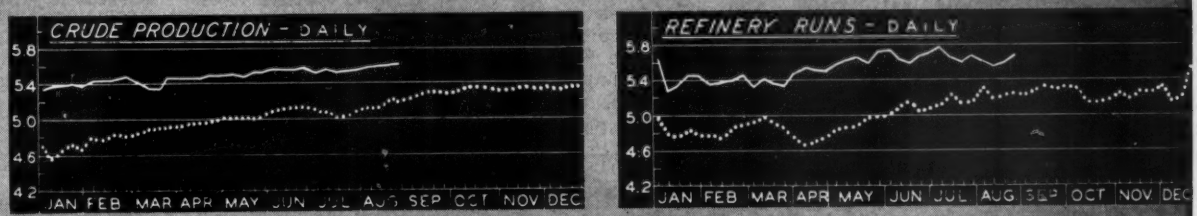
STOCKS IN UNITED STATES

---- 1947 ——— 1948



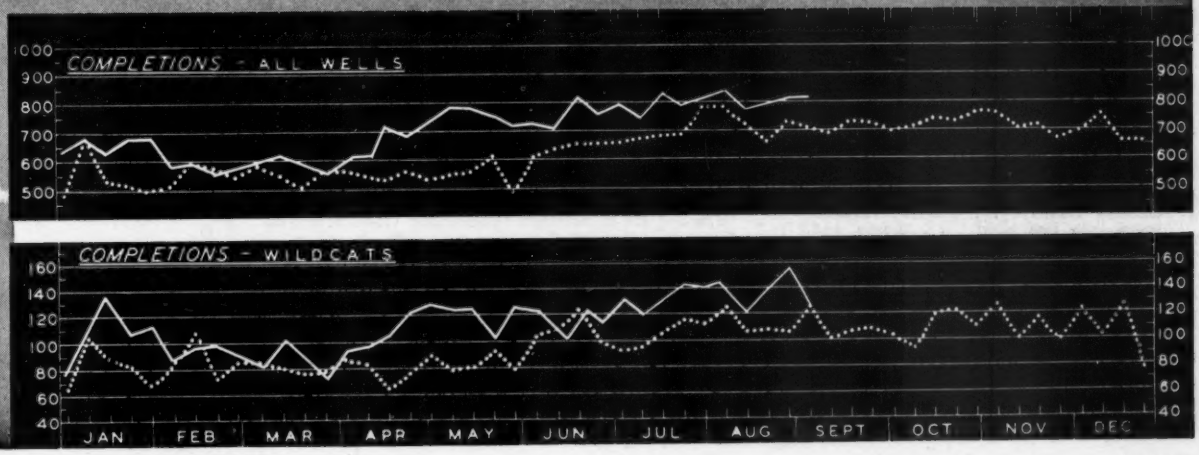
DAILY OPERATIONS

---- 1947 ——— 1948

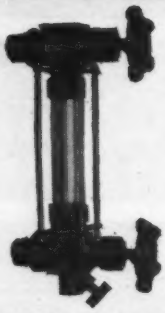


WEEKLY COMPLETIONS

---- 1947 ——— 1948



PENBERTHY
"ALL IRON"
LIQUID LEVEL GAGES



Body made from a special high strength alloy iron, shanks alloy steel and trim stainless steel. Extra heavy construction throughout, automatic and positive shut-off if glass breaks, heavy duty stuffing boxes. Conform with A.P.I.—A.S.M.E. requirements.

The "All Iron" is one of the complete line of Penberthy gages that meet every liquid level gage requirement.

PENBERTHY INJECTOR CO.
DETROIT, MICH. Canadian Plant WINDSOR, ONTARIO

Why THE INDUSTRY'S LEADING CENTRIFUGE?

BECAUSE:

Heavy duty, ruggedly constructed and extremely simple in design . . . Gets quick, accurate results . . . produces required speed with less effort . . . Cranks and heads of 100 CC and 15 CC size machines interchangeable . . . Meets A.S.T.M. Standard Method D-96 and A.P.I. Code No. 26 requirements.

W·H·CURTIN & CO. Inc.
DEPT. "C"
HOUSTON TEXAS . . . NEW ORLEANS LA.

MARKETS

ALL petroleum products in the Mid-Continent area were reported "freely available." Demand generally remained firm. Greatest weakness in the market still was No. 6 residual oil. Some weakening in demand was noted in both gasoline and No. 2. With the approaching winter season possibly only a few weeks off, demand which might ordinarily be expected to pick up, at this time for light burning oils is still slackening as a result of high stock levels in this material.

No. 6 Quotation Drops

Another 10-cent drop in the quoted price for No. 6 residual fuel oil was listed last week by a large supplier in the Mid-Continent area. The new spot tank-car price f.o.b. Group 3 was $2.30—still well above the "going" price. The same supplier reduced his neutral oil, 200 visc., 0-10 pour point from 21 to 19 cents.

One supplier remarked that some marketers in the northern section of the country may be taking the prospects of "no oil shortage" in too much of an unqualified sense and that some of the buyers in that area were of the opinion that oil was just "running out of our ears" in the Mid-Continent area. One marketer said that he thought kerosine and No. 1 oil were no more easier to obtain now than they were a year ago, but neither were they any more difficult.

Buyers in the Mid-Continent area reported that gasoline which they could get now for 10½ cents without any difficulty they were paying 12½ cents for 90 days ago. No. 2 was said to have shown some weakening in the past week. One supplier said that he was paying 9 cents for fuel oil which a month ago he paid 9¼ cents and 2 months ago paid as high as 9½ cents. Because of the storage situation of this material it is in much the same situation as No. 6 or at least approaching it.

Another aspect presented by the storage problem was expressed by a member of the Texas Railroad Commission when he said that shortages of butane of liquefied petroleum gases will probably recur next winter because "there will not be enough steel to solve the storage problem this year."

One supplier said that he is greatly interested in seeing results of crude runs to stills after about the first 2 weeks of this month. As a result of the high stock levels in some of the petroleum products, particularly No. 6 and No. 2, he said that there might be an indication of a sharp drop off in production yields of these two products.

Summer Discount Withdrawn

Along the Atlantic Seaboard both Esso Standard Oil Co. and Shell Oil Co., Inc., last week withdrew their 0.7 cent per gallon "summer fill up" discount for light heating oils following a last minute rush by some buyers to lift allocations before the September 1 discount expiration date.

No. 6 in the New York Harbor area was offered at $3.00 barge and in some instances $2.90. Buying interest, however, was reported slack. Kerosine and No. 2 fuel oil offerings at 10.75 and 9.75 cents were reported. A slight increase in demand lent a shade brighter tone to the South Texas grade lubricating oil market during the past week, some observers said. Some increase in gasoline demand was felt in the New York area as a result of the warmer weather and the anticipated consumption over the Labor Day week end.

Representative Quotations

Representative spot-market quotations of leading suppliers as of September 6, 1948. Figures are f.o.b. plant for tank-car shipment in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor	Texas Gulf Coast
Regular gasoline, 73-75 octane	10½-10¾	11.6-12* 10.5-11.9†	10½-11½
Premium gasoline, 78-80 octane	11¼-11½	10.6-13.4	11¼-12¼
42-44 w.w. kerosine	9½-9¾	10.3-11.7	9½-10¼
No. 2 straw fuel oil	9-9¼	9.4-10.1	9-9½
No. 6 residual	$2.00-2.20	$3.03-3.37	$2.10-2.65

*Branded (74-76 octane); †Unbranded (74-76 octane).

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	8½	8	8¼
Grade 18-55	10.2	9.6	9.9

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	12-14.5
750 vis., No. 3-4 neutral	15-17.25
2,000 No. 5-6 neutral	17-21

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	33
200 vis. No. 3 neutral, 0-10 pp.	19

Western Pennsylvania

145-155 vis. 10 p.t. bright stock	47
180 vis. p.t. neutral	45

CRUDE-SCALE WAX

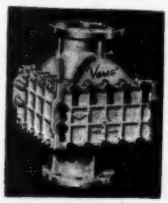
Mid-Continent

130-132 A.S.T.M. melting point	6¼-6½

FLAME PROTECTION

FOR ALL YOUR *Inflammable* GAS LINES!

"VAREC" *approved* HORIZONTAL FLAME ARRESTERS 2" to 12" Sizes



"VAREC" *approved* VERTICAL FLAME ARRESTERS 2" to 12" Sizes

IN handling inflammable gases, the danger of fire and explosion is ever present. Resulting flames will travel rapidly along lines of least resistance. When your gas lines are protected with "VAREC" Approved Flame Arresters, you can be sure of stopping flame propagation to any storage or gas-making unit.

"VAREC" Flame Arresters are scientifically designed with streamlined housings and expanding passageways to permit maximum gas flow with minimum pressure drop. The free area through the flame arresting grids is 4 to 5 times the free area of corresponding sized pipe. To counteract corrosion, these flame arresters may be obtained in suitable materials for various gases.

"VAREC" Approved Flame Arresters are listed by the Underwriters' Laboratories and approved by Factory Mutual Laboratories as well as other safety authorities. Demand that these accepted devices be installed on all your inflammable gas lines.

"Varec" CP-6

THE VAPOR RECOVERY SYSTEMS COMPANY

COMPTON, CALIFORNIA, USA

NEW YORK 30 CHURCH STREET · CLEVELAND 1201 EUCLID AVE. · CHICAGO 122 SO. MICHIGAN AVE. · TULSA 320 MAYO BUILDING · HOUSTON 6116 N. & M. BLDG.

CABLE: VAREC COMPTON (All Codes)

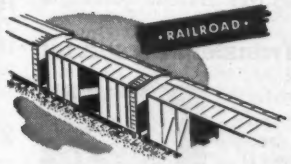
here's how

ZINC SERVES YOU

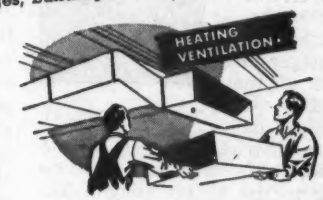
Galvanizing (Zinc coating) insures long-time, low-cost service . . . protects property . . . saves money. For as long as iron or steel is coated with Zinc, *it cannot rust!* For satisfaction, use galvanized materials . . . : they're "Sealed-in-Zinc" against rust.

ZINC INSTITUTE 2 OZ. COATING SEAL OF QUALITY

TIME proves galvanized sheets stay stronger longer. Used as roofing and siding, they give buildings the "strength of steel" . . . the rust protection of Zinc. The "Seal of Quality" (above) is your guide to economy in buying galvanized sheets. It means they carry at least 2 oz. of Zinc per sq. ft. Galvanizing also lengthens fence life and service.



Galvanized products in railroad industry guard bridges, buildings, cars., etc., against rust.



Strength, workability and resistance to heat as well as rust, make galvanized sheets ideal for heating and air-conditioning.

FREE BOOKLETS

Fully illustrated and packed with practical information on galvanized sheets and Metallic Zinc Paint. Send for these *free* booklets, *today!*

AMERICAN ZINC INSTITUTE
35 East Wacker Drive, Chicago 1, Ill. Rm. 2609

Send me without cost or obligation the illustrated booklets I have checked.

- ☐ Repair Manual on Galvanized Roofing and Siding
- ☐ Facts about Galvanized Sheets
- ☐ Use of Metallic Zinc Paint to Protect Metal Surfaces

Name_____

Address_____

Town_____ State_____

EQUIPMENT MEN ... in the News

Baumgardner Elected Vice President

BAUMGARDNER

National Radiator Co., Johnstown, Pa., announces the election of Carroll M. Baumgardner as vice president for sales, succeeding John C. Barnes, who resigned.

Baumgardner recently resigned as executive vice president and director of United States Radiator Corp., Detroit, and also as president and director of Capital Finance Corp., Detroit.

Baumgardner is chairman of the executive committee of the Institute of Boiler & Radiator Manufacturers and a director of Plumbing and Heating Industries Bureau, Chicago.

Eastman Transfers Personnel

C. I. STOKENBURY

Recent transfers of executive personnel have been announced by H. John Eastman, president of Eastman Oil Well Survey Co.

Clyde I. Stokenbury, manager for 2½ years of the Dallas office of the company, has been made district manager of the Bakersfield, Calif., office, a position he held prior to the Dallas assignment. The Dallas office has been combined with the company's expanded Oklahoma City district.

ROLAND ARMELL

W. D. COMPTON

Roland Armell, former manager of the Bakersfield district, has been made assistant to Ross E. Wiley, Pacific Coast division manager, at Long Beach. Armell, who has had wide experience in all divisions of the Eastman organization, recently spent a month in the general offices of the company in Denver, and visited the Calgary, Alberta, office.

William D. Compton, formerly of the Long Beach division, has been promoted to general field manager of the Eastman organization, and transferred to the general offices in Denver.

Don E. Woodward, of the Houston office, will be placed in charge of a new office to be opened soon in Abilene, Tex.

Fred E. Cooper Transfers Bloxom

Herbert E. (Buck) Bloxom, formerly of the Tulsa staff of Fred E. Cooper, Inc., manufacturers and distributors of oil-field equipment, has been assigned to the management of the California offices of the company, according to an announcement by Harold E. Cooper, president of the Tulsa firm. Bloxom, an employe of the Cooper organization since 1929, will make his headquarters a 11210 Alameda Street, Los Angeles.

Kelso-Burnett Establishes New Service

O. F. BURNETT, JR.

A new service for the oil industry—engineered electrical construction, complete from inception through engineering to construction—is announced by Oliver F. Burnett, Jr., president of Kelso-Burnett Electric Co. The new service of this 40-year old Chicago electrical-contracting firm covers new projects, conversions, or alterations, and is available directly to the oil industry, or through engineering firms, and general contractors.

According to Burnett, the war accelerated many new developments in electrical equipment and installation practices, especially in the oil industry. The new service will provide a valuable new type of much-needed assistance to oil companies interested in the correct selection and installation of the new and more efficient electrical systems, he stated.

E. T. Groat, who recently joined the firm as vice president after 26 years with General Electric Co., heads up the new Kelso-Burnett service.

Hydra-Line Appoints Key Executives

G. W. SINCLAIR

Blaine Johnston, general manager of the Hydra-Line division of Johnston Enterprises, announces the affiliation of George W. Sinclair as chief engineer, R. B. (Bob) Luirette as chief of quality control, and Carl H. Engelmohr as sales engineering manager.

R. B. LUIRETTE

C. H. ENGELMOHR

Sinclair graduated from the California Institute of Technology, worked as engineer for Reed Roller Bit Co. in the 30's and later as chief for Chester T. Allen Core Drilling Co. in Bakersfield. During the war years he was associated with Willys-Overland Co. Until his affiliation with Hydra-Line he managed his own firm of consultant engineers, which specialized in the design of large hydraulic machinery.

Luirette was formerly project engineer in charge of International Derrick & Equipment Co.'s Mid-Continent mobile-rig-development program. Previously, he was an engineer in the California division of the same company. Prior to this he was engaged in precision hydraulic inspection.

Engelmohr majored in marketing at University of California at Los Angeles, and was, until recently, service manager for the Western division of the International Derrick & Equipment Co. He has spent 10 years in the oil fields of the Mid-Continent and California areas in sales and sales promotional work. Prior to that time he had been employed by Carnegie-Illinois Steel Corp. in Chicago.

Clifford Made Field Engineer

D. Gordon Clifford, formerly chief engineer of Industrial & Commercial Electronics, is now field engineer at

Lenkurt Electric Co., San Carlos, Calif., manufacturer of carrier telephone and telegraph equipment. Clifford, who was one of the development engineers working on the klystron, has been on the engineering staffs of Sperry Gyroscope Co.; Westinghouse Electric Corp. (Bloomfied); Western Electric Co. (Kearney) and Sylvania Electric Products Corp. (Salem). He holds engineering degrees from Dartmouth College and Harvard University.

Byron Jackson Transfers Five

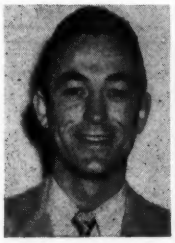
R. B. KIRK

The Oil Tool Division of Byron Jackson Co., Los Angeles, announces the following new assignments for sales personnel: Robert B. Kirk from sales training to export office, Los Angeles; John P. Kirby from Los Angeles

J. P. KIRBY

D. T. CLARDY

H. R. COLLINS, JR.



G. D. DWYER

sales to West Texas and New Mexico sales territory; Dick T. Clardy from Los Angeles sales to West Texas and New Mexico sales territory; Harry R. Collins, Jr., from sales training to Los Angeles Basin sales territory; and George D. Dwyer from Los Angeles Basin sales territory to Wyoming sales territory.

Kirby, prior to joining Byron Jackson, was associated with Security Engineering, Halliburton, and Reed Roller Bit. Kirk was formerly assistant manager, camera department of Columbia Pictures Corp. Clardy previously worked for Sunshine Iron Works, Odessa, and Pleasantville Construction Co. of Miami, Fla. Collins was formerly a draftsman for the Standard Oil Co. of California.

Facilities of the new stainless steel cold reducing and finishing plant of Republic Steel Corp. at Massillon have been erected in these buildings. Formerly used as an armor plate plant, the buildings were virtually reconstructed before the stainless-steel processing machinery was installed

New Emsco Assistant Sales Manager

K. F. FORSYTH

V. A. EUGE

K. F. Forsyth, manager of California and export sales of Emsco Derrick & Equipment Co., announces the appointment of Vaughn A. Euge to the post of assistant manager of California and export sales. Vaughn has been with Emsco since 1933, starting in the shop and advancing via production control, warehouse, material control, sales order, to his present position. He attended Loyola University, where he graduated with a bachelor of science degree, majoring in commerce and finance.

Union Wire Rope Names Boand

Union Wire Rope Corp. announces the appointment of R. B. Boand, formerly district sales manager at Chicago, as sales manager of Tuffy slings. Boand's headquarters will be in Kansas City.

N. C. Texas Fields

(Continued from page 147)

Williams, Sec. 26, Edward Haskins Sur., 4 mi. W Henrietta, dry, TD 6,200 ft., Caddo 5,766 ft.

Cooke County: Anderson & Guffey 1 M. Norman, James Hamilton Sur., ¾ mi. S Woodbine, dry, TD 4,567 ft.

W. O. Russell 1 John Potts, G. D. Morris Sur., 2½ mi. NW Burns City, dry, TD 2,060 ft.

Paul B. Scott 1 B. T. Rogers, Peter Clark Sur., 1 mi. S Gainesville, dry, TD 2,828 ft.

Eastland County: A. R. Dillard & Frank Wood 1 Pearl Dill, Sec. 41, ETRR Sur., 4 mi. NW Rising Star, dry, TD 3,204 ft., Caddo 2,544 ft.

Jack County: F. B. Pain Drilling Co. 1 Frank Richards, BS&F Sur., A-2,148, 5 mi. S Bryson, dry, TD 3,509 ft.

Jones County: Great Lakes Carbon Corp. 2 C. S. Ratliff, Sec. 12, Blk. 4, H&TC Sur., 8 mi. N Anson, dry, TD 3,799 ft., King sand 2,607 ft.

Viking Oil Corp. 1 A. Davis, Sec. 41, O.A.L. Sur., 10 mi. E Anson, dry, TD 2,327 ft., Hope lime 2,070 ft., Gunsight 2,160 ft., King 2,196 ft.

West Central Drilling Co. et al 1 Roy Largent, Godwin Subd. 49, League 149, DeWitt CSL, 4 mi. N Merkel, dry, TD 4,854 ft., Flippen 2,650 ft., Swastika 3,028 ft., Reef 4,304 ft.

Shackelford County: Hickok & Reynolds 1 J. P. Morris "F," Sec. 170, ETRR Sur., 17 mi. W Albany, dry, TD 1,717 ft.

Harry Lewis, Jr., 1 R. B. Cloud, Sec. 38, Blk. 11, T&PRR Sur., 6 mi. SW Albany, dry, TD 4,684 ft., base Caddo 4,358 ft., Mississippi 4,554 ft., Chappel 4,621 ft., Ellenburger dolomite 4,679 ft.

Oil Well Drilling Co. 1 Dell Newell "K," Sec. 114, ETRR Sur., 7 mi. W Albany, dry, TD 5,096 ft., Chappell 4,845 ft., Ellenburger 5,065 ft., porous dolomite 5,109-22 ft., elevation 1,772 ft.

Taylor County: Drilling & Exploration Co. 1 J. L. McLean, Sec. 73, Blk. 19, T&PRR Sur., 1½ mi. W Blair, dry, TD 4,003 ft., Dotham 2,509 ft., Flippen 2,910 ft., Swastika 3,330 ft., Canyon reef 3,940 ft., elevation 1,257 ft.

Carl Robinson 1 C. F. Sears, Sec. 161, Blk. 64, H&TC Sur., 11½ mi. NW Bradshaw, dry, TD 5,873 ft., Strawn with oil show 4,713-30 ft., Caddo 5,435 ft., Ellenburger 5,605 ft.

Wichita County: E. H. Pigg 1 Foster, Sec. 832, L. Denison Sur., 13 mi. NE Electra, dry, TD 1,897 ft.

Young County: J. J. Lynn 1 Benson, Sec. 1,450, TE&L Sur., 6 mi. E Olney, dry, TD 5,149 ft., Mississippi 5,062 ft.

Star Oil Co. 1 Geneva Gilmore, BBB&C Sur., 3 mi. SW Finis, dry, TD 4,811 ft.

A. R. Dillard 1 Sanger Investment, A. J. West Sur., 4 mi. NW Eliasville, dry, TD 3,527 ft.

Superior Oil Co. 1 A. C. Deats, J. W. Terrell Sur., 6 mi. NE Graham, dry, TD 5,100 ft., Mississippi 4,777 ft., dolomite 4,998 ft.

Classified Advertising

The Market Place for the Oil Industry

UNDISPLAYED

All ads, 12 cents a word. Minimum charge, $3.00 per insertion.
Centered Line, any ad, $1.00.
Box Numbers count 9 words when replies are to be sent to our Tulsa Office. Replies forwarded without charge.

DISPLAYED, PER INCH

$12.00 per column inch per insertion. One-point border and 12-point capitals are allowed. Larger type sizes not accepted.

All classified advertising payable in advance.
10% Discount if 3 insertions are ordered at one time.
COPY DEADLINE, 9:00 a.m. Monday prior to each week's issue.

THE OIL AND GAS JOURNAL
P. O. Box 1260, TULSA, OKLAHOMA

EQUIPMENT FOR SALE

FOR CABLE TOOLS
DEGEN PIPE AND SUPPLY CO.
Box 107, Red Fork Station, Tulsa, Oklahoma

FOR SALE: 1 Model #36-L Bucyrus-Erie Spudder; 1 Model #350 Jumbo-Buster drawworks. F. D. Bridges, 1109 Euclid, Oklahoma City, Oklahoma. Phone 3-7810.

FOR SALE

One Rotary Drilling Rig, Complete A-1 Condition, Wilson Mogul with D 13000 Caterpillar Engines 87 Feet Lee C. Moore Portable Derrick. Good 4½" Drill Pipe.

GEORGE S. ENGLE, BOX 655
EVANSVILLE, INDIANA
Phone 5-5179

MANUFACTURERS LATEST DESIGN

Hydraulic Casing Pulling Units. Complete line of equipment. Units made to your specifications. Truck Mountings or Skid Units. Repair Service and Parts.

OKLAHOMA MACHINE & SUPPLY CO.
Ada, Oklahoma

FOR SALE

No. 83 Speed Star Spudder, Mounted full trailer on hard rubber wheels, 4000' drilling and sand lines, complete tailing-in tools, dog house, Kohler light plant, etc. Very portable, good condition.

W. R. BOWMAN
214 Kennedy Bldg. Phone 7-3018 or 2-2633
Tulsa, Oklahoma

1942 AND 1943 BOILERS AVAILABLE NOW

3—Erie City Water Tube, three Drum, Stirling type, 210 H.P., 200# W.P. Built 1942. With Pulverizers. Condition excellent. Priced to sell, F.O.B. Cars, Arkansas.

3—Kewanee Firebox, two pass. Series 500, Hi-Pressure, Heavy Duty. 87 H.P., 100# W.P. Built 1943. With burners. Condition excellent. Priced to sell, F.O.B. Cars, Oklahoma.

OTHERS TO SELL

PETROLEUM EQUIPMENT, INC.
P. O. Box 887, Phone 2-6291
Tulsa 1, Oklahoma

EQUIPMENT FOR SALE

FOR SALE: Wilson Master Model Winch powered by 6 MZR Waukesha engine. Unit mounted on one and one-half ton Chevrolet truck equipped with fifty foot single pole telescoping mast. Terms. Melton Supply Company, Seminole, Oklahoma.

PIPE FOR SALE: A-1 guaranteed used lapweld oil and gas well casing, tubing, and line pipe. Sizes 8⅝" O.D. 24 lb., 7" O.D. 20 lb., 7" O.D. 17 lb., 5½" O.D. 14 and 15 lb., 4½" 13 lb. casing. 2⅜" O.D. 4.60 lb. Upset and 2⅜" O.D. 4.50 lb. Regular Tubing. 4" I.D. 11 lb., 3" I.D. 9 lb., 2⅜" O.D. 3.75 lb. Line Pipe. Also 8" and 6" Line Pipe. Write: Bryson and Jaynes, P. O. Box 831, Clarksburg, West Virginia. Phone 4010.

TRUCKS: I. C. C. Authority — Oklahoma, Kansas, Illinois, Indiana: 1944 Dart Tandem Cummings Diesel Engine; 1947 C-70 Auto Car Truck; 1947 Montgomery Tandem Float; 1946 International K-7; two 1945 International K-7; 1940 International D-35; 1947 Ford Pickup; and 1942 Model L Allis-Chalmers Tractor with blade, 70 Tulsa winch. Trucks equipped with Montgomery bodies, winches, dual wheel pole trailers. Box C-519, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: Model 50 Wichita Falls spudder with steel mast, PA-100 International motor, butane equipped. Now working on 2500 ft. top to bottom hole. Available end of present well. Shelby McIntosh, Box 198, Owensboro, Kentucky. Telephone 2640-W.

FOR SALE
CARDWELL WELL SERVICING UNIT

Mounted on new 3-ton Mack Truck, 50' twin-leg telescope mast, complete with
Tubing Tools
Rod Tools
Sand Pumps
Sand Lines
Miscellaneous Tools.

Also, 3,300'—17# 7" Lapweld Casing, 90'—16" Lapweld Casing, 100'—10" Lapweld Casing. Contact:

A. P. ADAMSON,
5806 East Eleventh, or Phone 9-3684, Tulsa, Oklahoma

PRACTICALLY NEW LATEST TYPE U-15 UNIT RIG

Purchased new May 1948. Drilled total 16,000 feet of hole.

Powered by two NKU Waukesha engines and includes 127-foot Lee C. Moore mast and substructure, 7¾ x 16 Gardner-Denver pump, 50 x 36 block, 4125 B-J hook, SS625 Ideco Swivel, HS171-B Ideco rotary, LRF Thompson shale shaker, 7½ KW generator, 4 x 6 water pump, pipe straightener, complete accessories and 7000 feet 4½" grade E drill pipe. Write for complete inventory.

LUCEY PRODUCTS CORPORATION
Tulsa, Oklahoma

WE BUY and SELL

Steel Pipe and Tubing
Pipe Fittings—Well Casing
Culverts and Valves

SONKEN-GALAMBA CORP.

2nd & Riverview, Kansas City 18, Kans.

EQUIPMENT FOR SALE

DRESSER COUPLING PARTS: 1,920-20" x ⅛" center rings, 3,840 followers—Used—Good Condition—Not cleaned. Colorado Interstate Gas Company, P.O. Box 1087, Colorado Springs, Colorado.

6,000 FT. 2½" TUBING
J-55 EUE 8 RD. THD. To be sold with light rotary drilling rig. IDECO draw works on steel substructure with 60' mast handles 6,500' tubing or 2,000' 3½ drill pipe. 4 x 6 Gaso pump, light plant, dog house, Brewster 12" rotary. Complete assortment of hand tools, 7,500' swab line, subs, connections, and misc. equipment to make rig complete to last detail. Box 123, Lubbock, Texas.

FOR SALE: Located at Bartlesville, 1—Model 37 Sullivan Shot Hole Drill mounted on 1942, 134" wheel base, 2 speed, dual tired truck. Price $4,000. Cities Service Oil Co., Patridge, Bartlesville, Okla.

FOR SALE: L-71 Cardwell Draw Works: Allis-Chalmers Double Pole Type "E" mobile unit; Allis-Chalmers Single Pole Type "UM" mobile unit. All A-1 condition. P.O. Box 3246. Corpus Christi, Texas.

FOR SALE

1—Complete set of seismograph equipment. Immediate delivery and ready for field operations. Contact Mr. Patridge, Cities Service Oil Co., Bartlesville, Okla.

FOR SALE

No. 2 Kearney & Trecker heavy duty milling machine, slightly used and in top condition, Timken bearings, new clutches, new G.E. 7½-H.P. 60 cycle ball bearing motor.

TEXACONE COMPANY
Box 4236, Dallas, Texas

FOR SALE

12—330 H.P. Type 10 Bessemer New 17" Power Cylinders complete ready to run with 16" to 18" Compressors. 1—330 H.P. Clark Horizontal with Compressors. Located Salem, Illinois.

ENGLE PETROLEUM, Incorporated
Box 655, Evansville, Indiana

1—J L 1335 BUDA GAS ENGINE. Completely overhauled and guaranteed. With or without engine starter and clutch power take off.
2—E K U Waukesha gas engines. Completely overhauled and guaranteed. One has engine starter.
3—E K U Waukesha gas engines. Mounted on steel rig drive skids. Good running condition.
2—Superior Model ORD 6-cyl. Diesel engines. Complete with skids, output clutch, radiators, and all standard equipment. Excellent condition.

EMPIRE MACHINERY COMPANY, LTD.
Odessa, Texas—Pho. LD 18
Tulsa, Okla.—Pho. 26773

COMPLETE PUMPING UNITS FOR SALE

6—Superior VDMB, 260 hp., 600 r.p.m. diesel engines with Farrel 600/3600 r.p.m. speed increasers and Goulds 760 g.p.m., 1050 ft., 4"-4 stage centrifugal pumps.

Completely overhauled and guaranteed.

TAMPA ARMATURE WORKS, INC.
P. O. Box 1318, Tampa, Fla.

EQUIPMENT FOR SALE

SULLIVAN 22 H.D. CORE DRILL
Practically new. N-2 hydraulic swivelhead.
R. B. McElwaine, P.O. Box 127
Little Rock, Ark.

APPROXIMATELY 2,000′ of 2⅜", Range 1, internal upset drill pipe, with regular A.P.I. tool joints in very good condition. Ideal for core drilling. Price $1.00 per ft. Located at Seguin Machine Shop, Seguin, Texas. Contact Box 1022, Del Rio, Texas.

USED Le Roi 6-, 8-, and 12-cylinder gas engines, complete and in A-1 condition for oil industry power. Priced to sell. Also one Model NKU Waukesha $1300. Write or call today. General Machine & Supply Company, P. O. Box 72, Wichita Falls, Texas.

STEEL STORAGE TANKS

2—55,000 bbl., 114′ dia. x 29′ 8" High
10—80,000 bbl., 118′ 3" dia. x 40′ 6" High

All riveted construction with steel roofs and structural steel roof supports. Tanks now standing near Norwalk, Calif., and available for prompt delivery. Detailed specifications and price available upon request.

HORWITZ PIPE & STEEL CO.

Tulsa, Okla. Ph. 2-9128

EQUIPMENT FOR SALE

FOR SALE: One AC Generating Unit; one 300 KW, 375 KVA 2300 Volt reconnectable for 480 volt 240 RPM 3-phase 60 cycle heavy duty 450 HP Bruce Macbeth Natural Gas Engine, directly connected to General Electric Generator complete with switchboard. P.O. Box 2073, Tulsa, Oklahoma.

FOR SALE: Four LPG products storage tanks, 500 barrel capacity. $4,000.00 each. One radial drill press used six months. $1,200.00. Tri-State Supply Company, Mt. Pleasant, Texas.

FOR SALE: Three Ideco Winches, practically new. Suitable for 8000′ well servicing. Terms. Melton Supply Company, Seminole, Oklahoma.

STEEL STORAGE TANKS

4—55,000 bbl.
1—37,000 bbl.

Above tanks all with steel roofs, now standing location West Texas area. Will quote dismantled and erected your grade in Mid-Continent area. Complete specs. available upon request.

TANCRED STEEL CONSTRUCTION CO.

Ph. Riverside 3546 Dallas, Texas

EQUIPMENT FOR SALE

PIPELINE Construction Equipment for Sale: Pipe cleaning machine with priming head, traveling or stationary, 6" to 12", excellent condition, $1,350. Two T40 International tractors with pipelayer attachments, good condition, very cheap. Contact C. W. Sternberg, 8250 Wier Drive, Houston, Texas. Phone Preston 7043.

DRILLING equipment, reconditioned ready for delivery. Failing, Franks, Ell Tulsa, Longyear, American, Sullivan, Fort Worth, Wichita, Keystone, National, Standards. Also steel derricks, cable tools, cable and good used casing, most sizes. Pressey & Son, Pueblo, Colo.

EXTRA good 5½ Keystone Joplin special Trailer mounted 8.25 dual tires. Air brakes, nearly new International motor. Lots of tools. 10" down. Good lines. L. C. Williamson, Pritchett, Colo.

FOR SALE: 110 Cleveland Trencher and Trailer, almost new. Lewis Stucker, 918 N. Market, Wichita, Kansas. Phone 5-6397.

FOR SALE: Two new 6NKU Waukesha. Delivered 7/1/48. Stored under cover. List price. No bonus. No trade. Harris Drilling Company, 525 Wichita National Bank Building, Wichita Falls, Texas.

FOR SALE: 1—U-15 Unit Draw Works powered with General Motors #671 Diesel Engines, Model FXQ 7¾ x 16 Gardner-Denver Power Pump, 17½" G. B. Oil Bath Rotary Table, Ideco Stream Line Swivel, 1—4125 B. J. Super Tri-Plex Rotary Hook, 1—127-foot Lee C. Moore Contilever Mast, 7500 feet—4½" O.D. 16.16# Grade "E" Drill Pipe, 1—7½ KW Thyrite Generator, complete with all accessories, Line Pipe, Fittings, Tools, etc., to fit Rig up complete. Inventory and prices on application. Rig can be inspected while in operation. H. A. McCarthy, 310 Thompson Building, Tulsa, Oklahoma, Phone 5-3296.

FOR SALE: Wilson Super Model Winch powered by 6 MZR Waukesha engine. Terms. Melton Supply Company, Seminole, Oklahoma.

2—74,000 Bbl. Cap. 140′x40′ Vertical Steel Storage Tanks

A-1 Condition Clean. Immediate Delivery at Morgantown, W. Va.

Darien Corp., 60 East 42nd Street, New York, N. Y.

MARINE DEPARTMENTS AND OFF SHORE DRILLERS

NOTICE

We carry Marine Vapor Proof and Explosion Proof Lighting Fixtures, Marine Wire and Cable, Drip-Proof DC Motors and Starters, Generators, Bells, Horns, Sirens; A full line of Marine Electrical Equipment and Supplies.

24 hour Service any place in the Gulf Area.

Send for your free copy of our catalogue.

POWER SUPPLY & ENGINEERING CO., INC.
500-506 MAGAZINE STREET,
NEW ORLEANS, LA.

TOWERS & VESSELS

1—TOWER 6′ I.D. x 84′; Shell 1⅛" Thick ASTM-A-70 Fire Box Plate; 18" Manways, Design Pressure 350#, Temp. 550° F.; Stress Relieved & Radiographed; 32 Trays, Shell Weight 97,000 lbs.
1—TOWER 9′ x 88′ 6"; Shell ¾" thick; ASTM-A-70 Fire Box Plate; 18" Manways; Design Pressure 125 lbs. Temp. 500° F.; Stress Relieved & Radiographed; 36 Trays; Shell Weight 111,000 lbs.
1—TOWER 5′ 6" I.D. x 103′ 4"; Shell 1½"; ASTM-A-70 Fire Box Plate; 18" Manways; Design Pressure 500 lbs.; Temp. 500° F.; Stress Relieved & Radiographed; 45 Trays; Shell Weight 144,000 lbs.
6—VESSELS 4′ 6" I.D. x 58′; Shell 1⅛"; ASTM-A-70 Fire Box Plate; Design Pressure 300#—Stress Relieved & Radiographed; Weight 36,000 lbs. each.
8—VESSELS 42" I.D. x 35′ 4" Over-all; Shell 3⅛"; Working Pressure 2,500 lbs.; Weight 72,000 lbs. each; Travelers Insurance Certificate.

PRINTS & TECHNICAL DATA AVAILABLE ON REQUEST.
INSPECTION INVITED. IMMEDIATE DELIVERY

PETROLEUM EQUIPMENT, INC.
P. O. BOX 887 TULSA, OKLAHOMA TELEPHONE 2-6291

NEW UNITS—NOT WAR SURPLUS

10—BUDA JL-877 Standard Oilfield Power Units: combination carburetor, oil filter, electric starting, Penn safety switch, Bosch magneto, Twin Disc clutch, radiator and sheet metal. 112 H.P. (Maximum) @ 1,000 RPM, 78 H.P. continuous rating. (Current list price $3,390.00.)

NET PRICE EACH
$1,995.00 F.O.B. TULSA

Box C-590, The Oil and Gas Journal
Tulsa, Oklahoma

SHOT HOLE DRILLS
LARGE AND SMALL

All are truck mounted, rotary, chain pull down, smallest pump size 3½ x 5. Some are in excellent condition, others need repairs. Price FOB Dallas from $3,000.00 to $8,000.00 including truck. For details write 8800 Lemmon Ave., Dallas 9, Texas.

FOR SALE
MILD STEEL SHEETS—PLATES

150 Tons	8 gauge	—5′ x 20′
100 Tons	10 gauge	—5′ x 12′
100 Tons	14 gauge	—3′ x 8′
100 Tons	⅛ inch	—5′ x 12′
250 Tons	¼ inch	—5′ x 20′

OCTOBER SHIPMENT

FABRIKANT STEEL PRODUCTS, INC.
50th Floor—Woolworth Bldg.—N.Y. 7, N.Y.
Telephone BEekman 3-3041
Member—Association of Steel Distributors

EQUIPMENT FOR SALE

FOR SALE: 22W Bucyrus-Erie — drilled less than 2,500 feet—mounted on Diamond T Truck. J. C. Tucker, Phone 4671, Henderson, Kentucky.

TWO CARDWELL RL double drum spudders. Top condition. Equipped for immediate operation. 59′ masts, light plants, lines, and tools. For prices and inventory write: Barnes Drilling Co., 22 W. Fourth Street, Tulsa, Oklahoma.

FOR SALE: Model 55 Wichita Falls Spudder with telescoping steel mast; steel tool house and tools for 7″ hole; powered with LeRoi motor in excellent shape. $5500.00 at present location. Box C-583, care The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: Brand new 1948 Bucyrus Erie 36-L, trailer mounted, latest model, has never turned a wheel. 15″ to 5½″ tools; Wilson elevators; new 4 cylinder light plant; new blower and forge; 100′ of 12″ pipe, 900′ of 10″, 1700′ of 7″; 1900′ of 5½″, all seamless; 8 round thread; new ⅞ drilling line; new ¾ sand line; casing spider—fishing tools. G. W. Miller, 706 Cherry St., Mt. Carmel, Ill., Telephone 166-J.

FOR SALE OR TRADE: Large Wichita Falls Spudder with Steel Mast 52 ft. high. 110 Hp. LeRoi drilling motor. Steel dog house. Drilling and fishing tools. Bits from 6 in. to 15½ in. Spudder located in Illinois. Charles S. Anderson, P.O. Box 31, Telephone 441, Coffeyville, Kansas.

EQUIPMENT WANTED

WANTED: Used Cross Reaction Chamber. Approximately 5′ OD x 44′ long. State price, condition, location, enclose sketch. Box C-422, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Small mounted trenching machine. Keystone Pipe & Supply Company, 902 Burk Burnett Bldg., Fort Worth 2, Texas.

WANTED: PROPANE STORAGE TANK, also Propane unloading pump or compressor. Give specifications, condition, price & shipping point. Central Development Company, Aylmer, Ontario, Canada.

WILL buy "drilling in" unit or spudder, with or without tools, capable 4,000 to 6,000 feet. Also old wells for salvaging. Give price, location and pertinent particulars in first letter. Box 435, Lawrence, Kansas.

WANTED: 6x12 Wilson-Snyder or 7x12 Gardner-Denver mud pump. Will consider other makes of medium size and weight. Box 1022, Del Rio, Texas.

HELP WANTED

AN Independent Oklahoma oil firm needs an assistant Purchasing Agent. Must have practical knowledge of production, refining and pipe line equipment and supplies. Letter of application should state complete experience, references and salary expected. Box C-581, The Oil and Gas Journal, Tulsa, Oklahoma.

OIL company purchasing department clerk wanted. Applicant should be familiar with materials used in all departments, refining, pipeline and production. Field experience helpful, excellent opportunity. Give complete experience record. Box C-580, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Experienced Surveyors for Gravity Crews, minimum domestic salary $250.00, Foreign $350.00. Best working conditions. Box C-584, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEER

Experienced graduate petroleum engineer to supervise field operations with production department of independent refinery on Texas Gulf coast. Must be between 28 and 35 years of age. Must have thorough understanding of drilling, well completion, and relative production problems. In reply submit complete education and experience record stating salary expected.

P. O. Box 1581, Corpus Christi, Texas

HELP WANTED

WANTED
GOOD ENGINEER-DRAFTSMAN
AND GOOD DRAFTSMAN

for work with major pipe line company, located in Tulsa. Applicants must be qualified. Good pay. Write giving all details, experience, and qualifications. Box C-577, The Oil and Gas Journal, Tulsa, Oklahoma.

CHIEF PETROLEUM ENGINEER: Attractive position open for a young man with five to ten years experience in oil production at a responsible level. Capable of originating decisions and exercising own judgment on matters of technical and responsible matters. A graduate in Petroleum Engineering, Mechanical Engineering, or Chemical Engineering. Good appearance and plenty of executive ability. Salary $10,000. All replies confidential. Write full details to: Chas. J. Loveless, Personal Service, 508 Mayo Building, Tulsa, Oklahoma.

CAPABLE MECHANICAL ENGINEER experienced in supervising maintenance of rotary drilling rigs. Good salary. Give past record and references. Correspondence confidential. Box C-576, The Oil and Gas Journal, Tulsa, Oklahoma.

United Geophysical Company, Inc.

595 East Colorado Street

Pasadena 1, California

offers employment to experienced Gravity and Seismic

Party Chiefs

Seismologists

Computers

Observers

in both North and South America and the Middle East

SALES ENGINEER

A well established manufacturer of technical specialties for the oil and chemical industries requires the services of a sales engineer in the Southwest.

Excellent opportunity for the right man with the necessary background and experience.

Box C-578

The Oil and Gas Journal

Tulsa, Okla.

ENGINEERING

During the next several months we will increase our Engineering Organization engaged in the design of Oil Refinery Plants and Power Plants. Location Cleveland, Ohio. The men we need should be qualified as draftsmen, designers, checkers or in higher engineering skills on design of piping, instrumentation, pressure vessels, structural steel, concrete, mechanical or electrical. For presenting your qualifications and prompt consideration, write to us for application form.

ARTHUR G. McKEE & CO.

2300 Chester Ave., Cleveland 1, Ohio

HELP WANTED

WANTED: Married man with 10 years or more of drafting room experience in the design of welded pressure vessels for oil industry use. Must be able to organize drafting department to produce shop drawings, both for production items and tailor made orders suitable for practical shop fabrication practices. Job is permanent as chief drafsman. Adequate beginning salary plus year-end bonus and company paid trust fund participation. Location: Tulsa, Oklahoma. Box C-560, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Process Engineer—With Several Years' Experience—for Oklahoma Refinery. Send full particulars on education, experience and salary expected. Box C-511, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: OIL FIELD MECHANIC—experienced Diesel and Gas engines—heavy equipment. House furnished in yard at Hobbs, New Mexico. Apply by letter stating experience and references. Makin Drilling Company, Box 131, Hobbs, New Mexico.

LAND MAN with executive ability for large operating company in Mid-Continent. Must be familiar with developments and land work in Texas. Replies will be confidential. Our qualified employes are aware of this ad. Box C-517, The Oil and Gas Journal, Tulsa, Oklahoma.

WELL established growing independent located in the Rocky Mountain Region needs a graduate production engineer with several years experience. Need not be experienced in, but must be capable of undertaking reservoir studies. Part of time will be devoted to drilling and production operations. Complete information is desirable with first letter. C-543, The Oil and Gas Journal, Tulsa, Oklahoma.

OIL Industry Employment Service, 319 Castle Bldg., Tulsa, Okla. Tom Robinson, Mgr., phone 4-5974. No fees to pay. Foreign service in Persian Gulf area. Needed now: Production and Petroleum Engineers $450 to $650. Rotary drillers $480, age limit 55. Derrickmen age 25 to 35. All must be experienced. Write for details.

GRADUATE PETROLEUM ENGINEER, under 30, production oil tool sales. Must be willing to locate in any Mid-Continent oil field. Salary and bonus. Six months' training program. Company car furnished. Company established 30 years. Application by letter only: Box C-574, The Oil and Gas Journal, Tulsa, Oklahoma.

WORKS MANAGER (Age 35-40) experienced in Pressure Vessels, Steel Plate Fabrication, and Field Direction. Give full information including technical training, experience, and salary required. Location, Mid-West. Confidential. Box C-570, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Experienced man in oil field operations, with full knowledge of the oil business, including production, ability in leasing and negotiating drilling deals. Box C-565, The Oil and Gas Journal, Tulsa, Oklahoma.

MAJOR Oil Company wants graduate construction or mechanical engineer under 40 years old having experience large tankage operations and pumping equipment. Headquarters Tulsa. Box C-561, The Oil and Gas Journal, Tulsa, Oklahoma.

SITUATIONS WANTED

SITUATION WANTED: Science Graduate of Cambridge University, England, 30, worked in European refinery, wishes to acquaint himself with American refinery techniques, desires position preferably in plant operation. Starting salary secondary. Box C-587, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST, 31, married, no children, B.S. degree, 7 years' experience geology-petroleum engineering; desires position in subsurface geology; foreign or domestic; speaks Spanish; available January 1. Box C-585, The Oil and Gas Journal, Tulsa, Oklahoma.

LAND DEPARTMENT SCOUT: Three years' experience in Land and Geological Departments, same Scouting. Familiar with North Louisiana, South Arkansas, Mississippi and East Texas. Box C-575, The Oil and Gas Journal, Tulsa, Oklahoma.

SITUATIONS WANTED

EXPERIENCED OIL EXECUTIVE

GRADUATE PETROLEUM ENGINEER, 40 years old, 15 year administrative background in organization, planning, and direction of production, drilling, and pipeline operations. Good knowledge of geology. Sales, purchasing, materials control and trading experience. Presently employed in supervisory position, Gulf Coast, desires to make connection as executive assistant to manager of substantial and aggressive independent oil company with future. Gulf Coast, West Texas or Rocky Mountain areas preferred. Box C-562, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM Geologist experienced with sample examinations, structural interpretations, mapping of assembled data and reports on local or regional geology desires connection with independent oil or drilling company located in Tulsa. P. O. Box 1884, Tulsa, Okla.

GRADUATE CHEMICAL ENGINEER, 26, alert, personable. Two years designing, cost estimating heat transfer equipment, pressure vessels for petroleum industry. Desires permanent position in petroleum refinery operation, engineering, with progressive organization. Opportunity to demonstrate capabilities paramount. Location immaterial. For complete resume, Box C-572, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM ENGINEER (REFINING), Colorado Mines 1940. Seven years experience laboratory, pilot plant, process design. One year chief chemist (chemical industry). Especially familiar lube oils. Desire work in product development or laboratory supervision. Box C-579, The Oil and Gas Journal, Tulsa, Oklahoma.

SALES MANAGER: Experienced with major companies, oil field supplies and machinery in Oklahoma City and territory. Box C-582, The Oil and Gas Journal, Tulsa, Oklahoma.

SALES MANAGERS—If your product is good and used by oil industry—I can sell it to my following in Oklahoma. Box C-591, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST. — Varied experience with major company desires position with Independent concern. Box C-586, The Oil and Gas Journal, Tulsa, Oklahoma.

PATENT ATTORNEYS

PATENT Practice before U. S. Patent Office. Validity and Infringement Investigations and Opinions. Booklet and form "Evidence of Conception" forwarded upon request. Lancaster, Allwine & Rommell, Registered Patent Attorneys, Suite 415, 815-15th Street, N.W., Washington 5, D. C.

LEGAL BLANKS

BURKHART LEGAL BLANKS since 1908. Oil-Gas (all states), Business, Real Estate, Legal Forms, Leases, Revised With Government Regulations, Commercial Printing, Catalog and Samples on request. Burkhart Printing & Stationery Company, 115 South Cincinnati, Tulsa 3, Oklahoma.

REAL ESTATE

MOVING TO HOUSTON?
Warehouse and Office Building on Supply House Row; Lease—$150/Month. J. N. Yeager, 602 Citizens State Bank, Houston 2, Texas.

FOR SALE

TRUCK LETTERING AND TRADEMARK DECALS made for your trucks and equipment. Easy to apply, uniform, distinctive, economical for small or large needs. Write for catalog. MATHEWS COMPANY, 827 S. Harvey, Oak Park, Illinois.

ALUMINUM PAINT—200—6 gallon cans. Exterior Spar Varnish vehicle. Highly polished, Aluminum Paste pigment in separate container. Distributors Liquidation. Regular price $33.60—take any part, $12.00 per 6 gallon can. Send check with order. The National, 606 Walnut, Kansas City, Missouri.

FOR SALE: Two (2) Burroughs Moon Hopkins Machines. Specially adaptable to oil accounting for preparing crude run statements and prorating amounts between interest owners. Used approximately 18 months. Excellent condition. Write Box C-589, The Oil and Gas Journal, Tulsa, Oklahoma.

TWO

LOCKHEED LODESTARS

complete airline equipment former Mid-Continent Airline planes, low time engines and propellers. Perfect condition throughout. Easily converted to executive type interior. Each

$15,000

PRAIRIE AIRWAYS, INC.
Lincoln, Nebraska

BUSINESS OPPORTUNITIES

FOR SALE: Fully equipped Oil Field Machine Shop. Two portable welding trucks. Good location, good business. Priced to sell. S.R.S Machine and Supply Company, Box 824, Thermopolis, Wyoming.

UNUSUAL OPPORTUNITY

to set yourself up in a highly profitable business in your own territory.

We own a time-tested PATENTED method of removing any type of sludge from petroleum tanks, cars & tankers.

Leading Oil companies have used and recommended our service, locally.

We are now offering exclusive franchises in the oil producing states.

Send for complete details.

INTERNATIONAL TANK SERVICE CO.

907 Freylinghausen Newark, N. J.

ROYALTIES

ANDREW J. BARRETT
The Philtower
Tulsa, Oklahoma

DEEDED ROYALTIES
San Juan Basin & Permian Basin. Write Harry S. Wright, Wright Bldg., Farmington, New Mexico.

WE will buy producing or non-producing oil royalties. Send particulars. Standard Security Company, 115 Broadway, New York 6.

SERVICES

CAPITAL SEEKERS: Advice in Corporate organization and securing capital; also review past operations. W. C. Hitchman Co., 90 Wall St., New York 5, N. Y.

LEASE AND DRILLING BLOCKS

FOR SALE: 12 barrel settled production on 120-acre lease. Depth 325 to 450 feet. Many more good looking locations yet to drill. W. P. Harley, Bowling Green, Kentucky.

TENNESSEE—80,000 acres; fee $3 per acre; liquidation; est. 100 miln ft. timber; full mineral rights, details E. Jester, 12744 Vanowen, N. Hollywood, Calif.

WANTED—Principal to participate with us in the drilling of a test well on a large block of leases in Oregon. Write Ervin Kroker, Camas Valley, Oregon.

FOR SALE: Oil and Gas Leases and Production in shallow territory. We do drilling and furnish equipment for wells; also look after shooting and equipping. W. P. Harley, Bowling Green, Kentucky.

FOR LEASE on ⅛ basis for test drilling 100,000 acres of untested Cumberland Plateau land by owner. One test hole found 5 veins of coal aggregating 41 feet. G. E. Harrison, Crossville, Tenn.

HAVE been offered $35,000 for a ⅝ interest in my oil and gas structures in North-Central Tenn., the money to be used to drill four test wells thereon. I will give a ½ interest therein for that amount and for that purpose. N. M. Sauls, Geologist, Cookeville, Tenn

1920 ACRE lease adjoining Major Co. block with four shut-in gas wells. 3200 ft. depth. Excellent prospect. Want development. S. A. Hole, Shelby, Montana.

LEASES: Proven, semi-proven, and wildcat in Campbell, Crook, Laramie, Goshen, Albany, and Platee Counties, Wyoming. Large drilling blocks or 40-acre tracts, priced to sell. These areas are scheduled for considerable exploratory development by major companies. Box 382, Cheyenne, Wyoming.

HAVE 800 acres. Offsetting well flowing 23 bbls. per day after 23 years, 41 gravity oil, no water. Approx. 4,000 feet. Excellent sub-surface geology, Central Texas. Want development. Box C-569, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: Producing oil lease, 480 acres Osage County, Bartlesville Sand. Gas repressuring plant. Production 12 bbls. daily. Six-room modern lease house. E. E. Shannon, Box 631, Sedan, Kansas. Phone 154.

DRILLING OPPORTUNITY: One of the most promising oil structures in Montana now available for development. Box C-588, The Oil and Gas Journal, Tulsa, Oklahoma.

REAL ESTATE

CHOICE DEEP CHANNEL OHIO RIVER FRONTAGE
IN EVANSVILLE, INDIANA

Office and frame warehouse buildings with 27,000 square feet of storage space. R. R. Switch. Lot size over one acre with 144 feet river frontage, 400 feet on South Wabash Avenue.

Bids accepted until Nov. 1, 1948, with right to reject any and all bids.

Write for details or appointment. No agents.

EVANSVILLE SASH & DOOR CO. INC.
Evansville 12, Indiana

LEASES ROYALTIES
PRODUCING OR NONPRODUCING
Texas, New Mexico, Oklahoma, Louisiana and Illinois.
Inquiries Invited
B. D. BUCKLEY
60 Broadview Drive, Clayton (5), St. Louis, Missouri

ADVERTISERS

Abegg & Reinhold Co. 128
Acme Fishing Tool Co. 134
Allegheny Ludlum Steel Corp. 28
Allis-Chalmers Mfg. Co. 27
Aluminum Co. of America 34
Amercoat Div. American Pipe & Construction Co. 29
American Bosch Corporation 39
American Coach & Body Co., The 11
American Iron & Machine Works Co. 87
American Manufacturing Co. of Texas 4
American Petroleum Institute (Oil Industry Information Committee) 101, 120, 142
American Zinc Institute 151
Ampco Metal, Inc. 93
Baird Mfg. Co. 138
Baldwin-Duckworth Division of Chain Belt Company 14
Bethlehem Steel Co. 1
Bettis Corp. 110
Bonney Forge & Tool Works 37
Boyd Co., Clarence L. 122
Brown & Root, Inc. 2
Brown Instrument Co., The, Div. of Minneapolis-Honeywell Regulator Co. 23
Cameron Iron Works, Inc. 33
Campbell Co., J. A. 144
Chase Brass & Copper Co. 25
Chicago Bridge & Iron Company 58
Classified Advertising 154, 155, 156, 157
Continental Oil Co. 26
Coppus Engineering Corp. 3
Crane Co. 7
Crose Mfg. Co., Inc., M. J. 120
Crutcher-Rolfs-Cummings, Inc. 121
Curtin & Co., W. H. 150
Darling Valve & Mfg. Co. 20
Dean Brothers Pumps, Inc. 147
Dodge Division of Chrysler Corp. 32
Dragon Manufacturing Co. 144
Erie Bolt & Nut Co. 96
Ethyl Corp. 98, 99
Ewing Manufacturing Co. 19
Fairbanks, Morse & Co. 140
Franks Mfg. Corp. ..... Front Cover
Fulton & Co., R. H. 122
George Engine Co., Inc. 146
Glass Fibers, Inc. 120
Glidden Co., The (Soya Products Div.) 119
Globe Oil Tools Co. 126
Goodall Rubber Co. of Texas 102
Goodrich Chemical Co., B. F. (Hycar) 42
Grancell, L. H. 127
Grant Oil Tool Co. 115
Gulberson Corporation, The 96
Gulf Oil Corp. 80
Gunite Concrete & Construction Co. 118
Haering & Co., Inc., D. W. 139
Halliburton Oil Well Cementing Co. ..... Inside Front Cover
Harshaw Chemical Co., The 13
Hazard Wire Rope Division of American Chain & Cable Co., Inc. ..... Inside Back Cover
Hobbs Manufacturing Co. 142
Hobb Swetnam Co., Inc. 147
Huey & Co., S. E. 123
Hughes Tool Co. ..... Back Cover
Hyatt Bearings Division, General Motors Corp. 35
Johns-Manville Corporation 145
Johnston & Jennings Co., The (Oceco Division) 36
Jones & Laughlin Steel Corp. 62
Jones & Laughlin Supply Co. 22
Kellogg Co., The M. W. 108
Kolor Kut Products Co. 123
Koppers Co., Inc. 143
Lane-Wells Company 21
Larkin Packer Company, Inc. 135
Latex Construction Co. 121
Leeds & Northrup Co. 5
Lehmann Machine Co. 82
Linde Air Products Co., The 92
Line Scale Co., Inc. 129
Lockett & Co., Ltd., A. M. 82
Lone Star Cement Corporation 40
Lukens Steel Co. 104
Manning, Maxwell & Moore, Inc. 101
Mathey Machine Works, Inc., Frank 129
Mayfair Hotel 138
Mercoid Corp., The 96
Miller Sand Pump Co. 129
Mission Manufacturing Co. 94
Moon Manufacturing Co. 101
Moore Corp., Lee C. 130, 131
Murray Rubber Co. 15
National Airoil Burner Co., Inc. 118
National Supply Co., The 72, 73
Nikoh Tube Co. 9, 10
Norris Brothers, Inc. 82
Oil Base, Inc. 106
Oil Well Mfg. Corp. 142
Oil Well Supply Co. 17
Onan & Sons, Inc., D. W. 137
Overstrom & Sons 128
Owen Tool Company 126
Patterson-Ballagh Division, Byron Jackson Co. 24
Penberthy Injector Co. 118, 123, 127, 138, 144, 150
Perrault Brothers, Inc. 122
Petroleum Electric Power Assn. 124
Petroleum Rectifying Company 117
Raymond Concrete Pile Co. 31
Rector Well Equipment Co., Inc. 140
Refinery Engineering Co., The 118
Republic Rubber Division of Lee Rubber & Tire Corp. 8
Rockford Clutch Div., Borg-Warner 120
Ross-Martin Co. 144
Rust-Oleum Corp. 89
Ryerson & Son, Inc., Joseph T. 136
Santa Fe Tank & Tower Co. 103
Schlumberger Well Surveying Corporation 91
Shand & Jurs Co. 76
Smith Meter Co. Subsidiary of A. O. Smith Corp. 88
Socony-Vacuum Oil Co., Inc. 16
Spang-Chalfant Division of The National Supply Co. 71
Standard Oil Co. (Indiana) 30
Standard Oil Sales Co. 128
Standard Pressed Steel Co. 118
Standco Brake Lining Co. 129
Superior Engine Division of The National Supply Co. 74
Tapecoat Co., The 123
Taylor Instrument Companies 18
Texas Co., The 116
Thermoid Company 90
Thomas Flexible Coupling Co. 141
Thornhill-Craver Co. 79
Torrington Co., The 68
Union Carbide and Carbon Corp. 92
U. S. Steel Corp. Subsidiaries 17, 132
U. S. Stoneware Co. 93
Universal Atlas Cement Co. 132
Vapor Recovery Systems Co., The 151
Viking Pump Co. 137
Walter Motor Truck Co. 84
Westinghouse Electric Corporation 12
Wickes Boiler Co., The 61
Wilson Oil Tools, Web 129
Worthington Pump & Machine Corp. 6
Young Radiator Company 38
Youngstown Sheet and Tube Co., The 57

CALENDAR

September

The Instrument Society of America, third instrument conference and exhibit, Philadelphia Convention Hall, Philadelphia, September 13-17.

Pacific Coast Gas Association, annual convention, Hotel Casa del Rey, Santa Cruz, Calif., September 14-16.

American Petroleum Institute, Lubrication Committee, Hotel Traymore, Atlantic City, N. J., September 15-17.

National Petroleum Association, Hotal Traymore, Atlantic City, N. J., September 15-17.

Oklahoma Utilities Association, Gas Division, annual conference, Biltmore Hotel, Oklahoma City, September 17.

National Association of Corrosion Engineers, South Central section, Tulsa Hotel, September 20-21.

National Butane-Propane Association annual convention and trade exhibit, Congress Hotel, Chicago, Ill., September 20-22.

Independent Petroleum Association of America, annual meeting, Plaza Hotel, San Antonio, Tex., September 27-28.

October

American Society of Mechanical Engineers, petroleum division, Herring Hotel, Amarillo, Tex., October 3-6.

American Institute of Mining & Metallurgical Engineers, petroleum division, fall meeting, Adolphus Hotel, Dallas, October 4-6.

American Association of Petroleum Geologists, midyear meeting, technical session and 3-day field trip, William Penn Hotel, Pittsburgh, Pa., October 4-9.

American Gas Association, thirtieth annual convention, technical section, and exhibition of the Gas Appliance Manufacturerz Association, Ambassador Hotel, Atlantic City, N. J., October 4-8.

California Natural Gasoline Association, twenty-fourth annual fall meeting, Ambassador Hotel, Los Angeles, Calif., October 8.

National Lubricating Grease Institute, sixteenth annual convention, Edgewater Beach Hotel, Chicago, October 11-13.

American Association of Oilwell Drilling Contractors, eighth annual meeting, Rice Hotel, Houston, October 11-13.

Texas Mid-Continent Oil and Gas Association, twenty-ninth annual meeting, Fort Worth, October 14-15.

American Institute of Mining and Metallurgical Engineers, petroleum division, Elks Club, Los Angeles, Calif., October 14-15.

Natural Gasoline Association of America, regional meeting, Exhibit Hall at the fair grounds, Shreveport, La., October 15.

NOMADS

Houston Nomads, second Monday of each month, The Houston Club, Houston.

Los Angeles Nomads, second Wednesday each month, Jonathan Club.

New York Nomads: Golf party, Sept. 21, at Baltusrol Country Club, N. J.

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington 25, D. C. Notice is hereby given that the lands listed herein are offered through sealed bids on the terms hereinafter specified, to qualified bidders of the highest cash amounts per acre as a bonus for the privilege of leasing the lands under sec. 17 of the Leasing Act of February 25, 1920 (41 Stat. 437; 30 U.S.C. sec. 181), as amended. All bids must be submitted to the Director, Bureau of Land Management, Washington 25, D. C., on or before 1 p.m. of the date set out herein. Each bidder must submit with the bid one-fifth of the amount bid in cash or by certified check on a solvent bank or by money order made payable to the order of the Treasurer of the United States, and file the showing of qualifications to receive a lease required under 43 CFR 192.42 (b) and (c). The envelopes should be plainly marked that they are not to be opened before the date and hour set out herein, and should show the number of the parcel and the name of the field. No bids received after the hour fixed herein for receiving bids will be considered. The remainder of the bonus and the annual rental must be paid and an acceptable surety bond in the sum of at least double the amount of rental, but in no case less than $1,000 nor more than $5,000, must be furnished by a successful bidder prior to the issuance of a lease. An acceptable $5,000 surety bond will be required prior to commencing drilling operations on the land. The deposits of the other bidders will be returned upon acceptance of the successful bids. Bidders are warned against violation of section 59, U.S. Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids. Royalties payable to the United States will be at the rate of 12½ per cent to 25 per cent for oil, and 12½ per cent to 16 2/3 per cent for gas, in accordance with Schedule B in the lease form. Annual rental will be at the rate of $1.00 per acre. The land is offered in one parcel described as S½SW¼ sec. 34, T. 27 N., R. 90 W., 6th P.M., Wyoming, 80 acres, and is within the known geologic structure of the Lost Soldier field. Bids must be submitted on or before 1 p.m., Daylight Saving Time, September 29, 1948. Marion Clawson, Director.